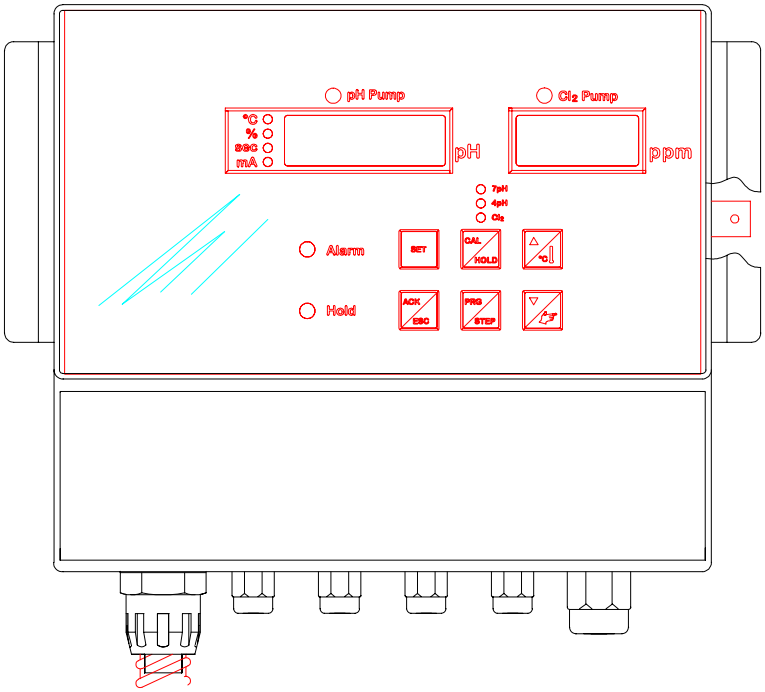
# Manual de Instrucciones

## PC95

pH – cloro – temperatura

**(Cod. 136317)**




Manual: 0000136317
Versión: r 2.0

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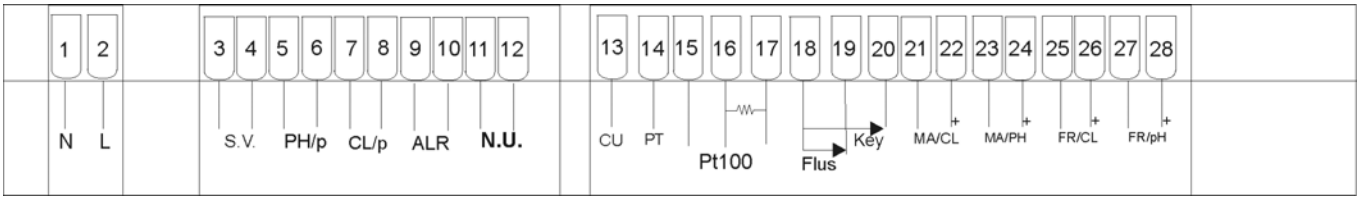
# 1___DATOS TÉCNICOS

| | |
|---|---|
| MEDIDAS: | 240 mm – 245 mm – 140 mm |
| GRADO DE PROTECCIÓN: | IP65 PROTEGIENDO EL BNC DEL ELECTRODO pH |
| SECCIÓN DE LOS BORNES: | $4mm^2$ , o diámetro 2,4 mm |
| | |
| ALIMENTACIÓN: | standard 230V ± 10% 50-60 Hz, bajo pedido 115V |
| CONSUMO: | 15W |
| CAPACIDAD MÁXIMA EN LOS RELÉS: | 3A 250Vac (con carga resistiva) |
| | |
| TEMPERATURA DE TRABAJO | 0…50 ° C |
| TEMPERATURA DE ALMACENAJE | -10…+70 °C |
| | |
| ESCALA DE MEDIDA DEL pH: | 0…14,00 pH |
| IMPEDANCIA DE ENTRADA: | > $10^{13}$ ohm |
| COMPENSACIÓN EN TEMPERATURA: | MANUAL/AUTOMÁTICA 0…125 °C |
| AJUSTE DEL SET POINT: | ON / OFF |
| | PAUSA / TRABAJO |
| | PROPORCIONAL EN CORRIENTE: |
| SALIDA RETRANSMITIDA: | 0/4…20 mA separada galvánicamente |
| | Completamente configurable para retransmisión medición o regulación |
| | Resolución 255 puntos |
| | Carga máxima 1 K ohm |
| | |
| ESCALA DE MEDIDA DEL Cl: | 0…5,00 ppm o mg/l |
| COMPENSACIÓN EN TEMPERATURA: | Excluible |
| | MANUAL/AUTOMÁTICA 0…125 °C |
| COMPENSACIÓN EN pH: | Excluible |
| | Rango de compensación 6…8.35 pH |
| AJUSTE DEL SET POINT: | ON / OFF |
| | PAUSA / TRABAJO |
| | PROPORCIONAL EN CORRIENTE: |
| SALIDA RETRANSMITIDA: | +0/4…20 mA separada galvánicamente |
| | Completamente configurable para retransmisión medición o regulación |
| | Resolución 255 puntos |
| | Carga máxima 1 K ohm |

**NOTA. En las aguas de piscina tratadas con DICLORO o TRICLORO isocianurato es importante efectuar una buena renovación de agua de manera que el residuo ácido isocianúrico no supere los 50 ppm para garantizar una buena medida del cloro.**

# 2___CONEXIONES EN LA BORNERA

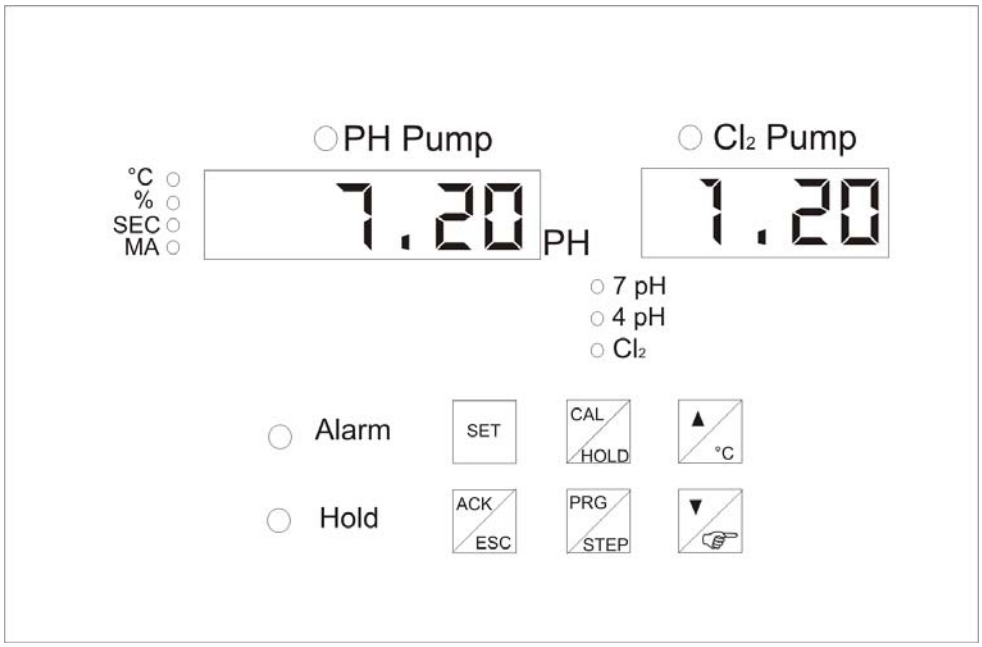



| N. Borne | Descripción |
|---|---|
| 1 | NEUTRO |
| 2 | FASE |
| | |
| 3 – 4 | RELÉ E.V. (ELECTROVÁLVULA) |
| 5 – 6 | RELÉ BOMBA PH |
| 7 – 8 | RELÉ BOMBA CLORO |
| 9 – 10 | RELÉ ALARMA |
| 11 – 12 | INUTILIZADO |
| 13 | ELECTRODO DE COBRE |
| 14 | ELECTRODO DE PLATINO |
| 15 | INPUT PT100 |
| 16 | INPUT PT100 |
| 17 | INPUT PT100 |
| 18 – 19 | INPUT SEÑAL FLUJO |
| 19 – 20 | INPUT SEÑAL KEY |
| 21 | SALIDA PROP. CORRIENTE CL (POLO NEGATIVO) |
| 22 | SALIDA PROP. CORRIENTE CL (POLO POSITIVO) |
| 23 | SALIDA PROP. CORRIENTE PH (POLO NEGATIVO) |
| 24 | SALIDA PROP. CORRIENTE PH (POLO POSITIVO) |
| 25 | SALIDA PROP. FREC. CL (POLO NEGATIVO) |
| 26 | SALIDA PROP. FREC. CL (POLO POSITIVO) |
| 27 | SALIDA PROP. FREC. PH (POLO NEGATIVO) |
| 28 | SALIDA PROP. FREC. PH (POLO POSITIVO) |

## NOTAS:

**REALIZANDO UN PUENTE ENTRE EL BORNE 15 Y EL BORNE 17 EL INSTRUMENTO DETECTA QUE LA SONDA ESTÁ DESCONECTADA Y PASA A LA REGULACIÓN MANUAL.**

# 3___PANEL DE MANDOS




## DESCRIPCIÓN GENERAL DEL TECLADO

| | |
|---|---|
| SET | Visualiza en secuencia los Set Point configurados, si la función está habilitada permite cambiar su valor. Utilizándola al mismo tiempo con la tecla MAN permite forzar el estado de los relés de Set. |
| PRG STEP | Presionando la tecla aparece el mensaje PrOG, manteniendo pulsada la tecla durante 5 segundos se entra en programación. Si la tecla está inhabilitada por la protección efectuada en la bornera, presionándola aparece el mensaje dIS.<br>Cuando se entra en programación cada vez que se presiona esta tecla se avanza un paso (step). |
| ACK ESC | Hace retroceder los pasos de programación. Si se mantiene presionada durante 5 segundos sale de la función de programación, guarda todos los datos en la memoria permanente.<br>Apaga el relé de alarma, pero si el estado de alarma persiste, el LED correspondiente pasa de intermitente a fijo y queda encendido hasta que se elimina la causa de la alarma. Elimina un mensaje de error y restablece el valor de fábrica del dato errado. |
| ▲ °C | Aumenta el valor visualizado en la fase de programación. Aumenta el valor visualizado con la tecla SET.<br>Visualiza la temperatura de referencia (manual o automática). Si la temperatura es manual presionada al mismo tiempo con la tecla DOWN varía su valor. |
| ▼ | Permite modificar el valor de temperatura. Reduce el valor visualizado en la fase de programación. Reduce el valor visualizado con la tecla SET.<br>Si es presionada al mismo tiempo con la tecla SET permite forzar en manual los relés de comando de las bombas. |
| CAL HOLD | Permite entrar en el Menú de calibración. |

## DESCRIPCIÓN GENERAL DE LOS INDICADORES LUMINOSOS

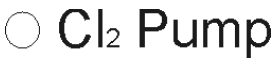
**Display de la medida pH**

**Display de la medida cloro**

**Diodo LED bicolor. Indica el estado de la bomba pH**

| | |
|---|---|
| **APAGADO** | La bomba del pH está apagada |
| **VERDE** | El Set Point está activo pero la bomba está temporalmente apagada |
| **ROJO** | El Set Point está activo y la bomba está encendida |
| **ROJO INTERMITENTE** | En la fase de programación indica que el parámetro visualizado se refiere al control del Set Point pH. |

**Diodo LED bicolor. Indica el estado de la bomba cloro**




| | |
|---|---|
| **APAGADO** | La bomba del cloro está apagada |
| **VERDE** | El Set Point está activo pero la bomba está temporalmente apagada |
| **ROJO** | El Set Point está activo y la bomba está encendida |
| **ROJO INTERMITENTE** | En la fase de programación indica que el parámetro visualizado se refiere al control del Set Point Cl. |

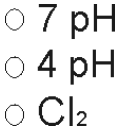
**Diodo LED Rojo. Indica un estado de ALARMA.**

| | |
|---|---|
| **ROJO INTERMITENTE** | Se ha producido un estado de alarma; el relé alarma está activo, para apagar la alarma presionar la tecla ACK. |
| **ROJO** | Se ha reconocido una alarma con la tecla ACK pero la causa que la había generado aún persiste, eliminando la causa el led Alarm se apaga. |

**Diodo LED Rojo. Indica un estado de parada total de las funciones del instrumento.**

| | |
|---|---|
| **ROJO** | Cuando está encendido señala el bloqueo temporal del funcionamiento de las bombas, las salidas en corriente quedan bloqueadas en el último valor retransmitido. |

**FUNCIONES DE CALIBRACIÓN**




| | |
|---|---|
| **7 pH** | El instrumento pide que el electrodo sea sumergido en una solución de muestra con 7 pH; por tanto está listo para efectuar una calibración del offset para el electrodo pH. |
| **4 pH** | El instrumento pide que el electrodo sea sumergido en una solución de muestra con 4 pH; por tanto está listo para efectuar una calibración de la ganancia para el electrodo pH. |
| **$Cl_2$** | El instrumento está listo para efectuar una autocalibración de la medida del cloro, espera la introducción del valor de cloro determinado con el método DPD. |

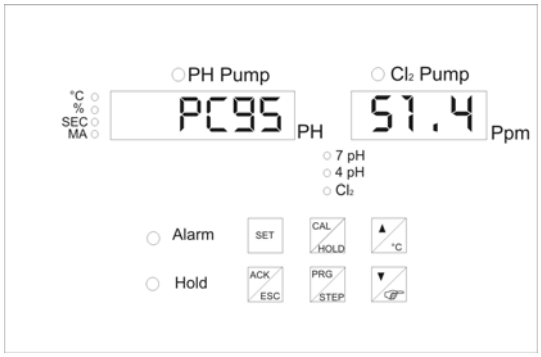
**UNIDAD DE MEDIDA**

°C ○
% ○
SEC ○
MA ○

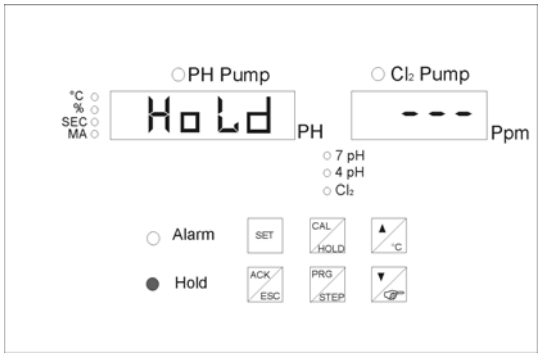
| | |
|---|---|
| **° C** | El valor numérico visualizado es una temperatura expresada en °C<br>Si este indicador está encendido contemporáneamente con el %, significa que el valor numérico visualizado es un coeficiente de corrección según la temperatura expresado en %/°C. |
| **%** | El valor numérico visualizado es un porcentaje |
| **SEC** | El valor numérico visualizado es una unidad de tiempo expresada en segundos |
| **mA** | El valor numérico visualizado es un valor de corriente de salida expresado en mA o es un parámetro de programación que actúa sobre una salida en corriente. |

# 4___ENCENDIDO Y CONFIGURACIONES PRELIMINARES

El instrumento presenta, al encendido, el mensaje **PC95 S 14** que indica el nombre y la versión del software que ha sido cargado.



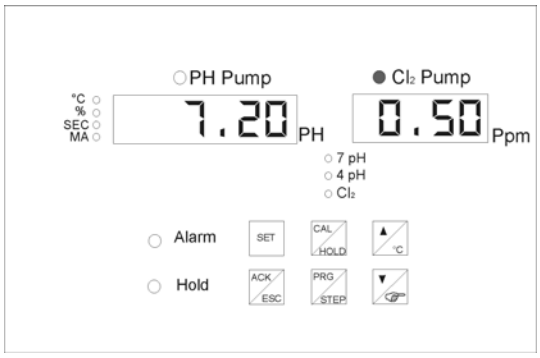

El instrumento visualiza el mensaje **HOLD ---** después de un tiempo de aproximadamente 10 segundos de espera, en el cual el instrumento ejecuta un test software, el instrumento visualiza la medida del pH y del cloro, <u>está claro que estos valores no son verdaderos ya que no ha sido efectuada la calibración de las sondas.</u>




**¡Atención!**
Apagar las bombas antes de encender el instrumento ya que podría causar una dosificación errónea debido al error de medida recién mencionado.

Abrir el flujo del agua en el panel y configurar, con el caudalímetro, un caudal de **60 Litros/hora** para garantizar un buena rotación de las bolas presentes en la sonda del cloro.

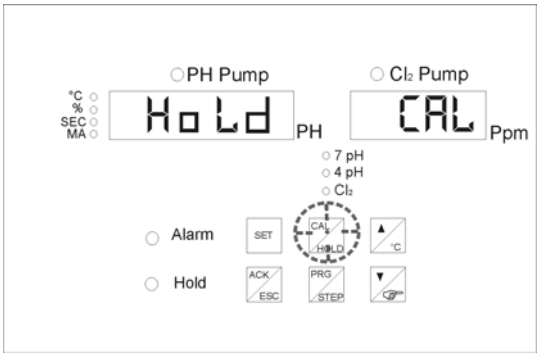
Regulación valores ph = 7.00 ph y cloro = 1.00 ppm (aproximadamente) manualmente y hacer circular el agua en el panel durante aproximadamente 4 horas para adaptación sonda ph y cloro.



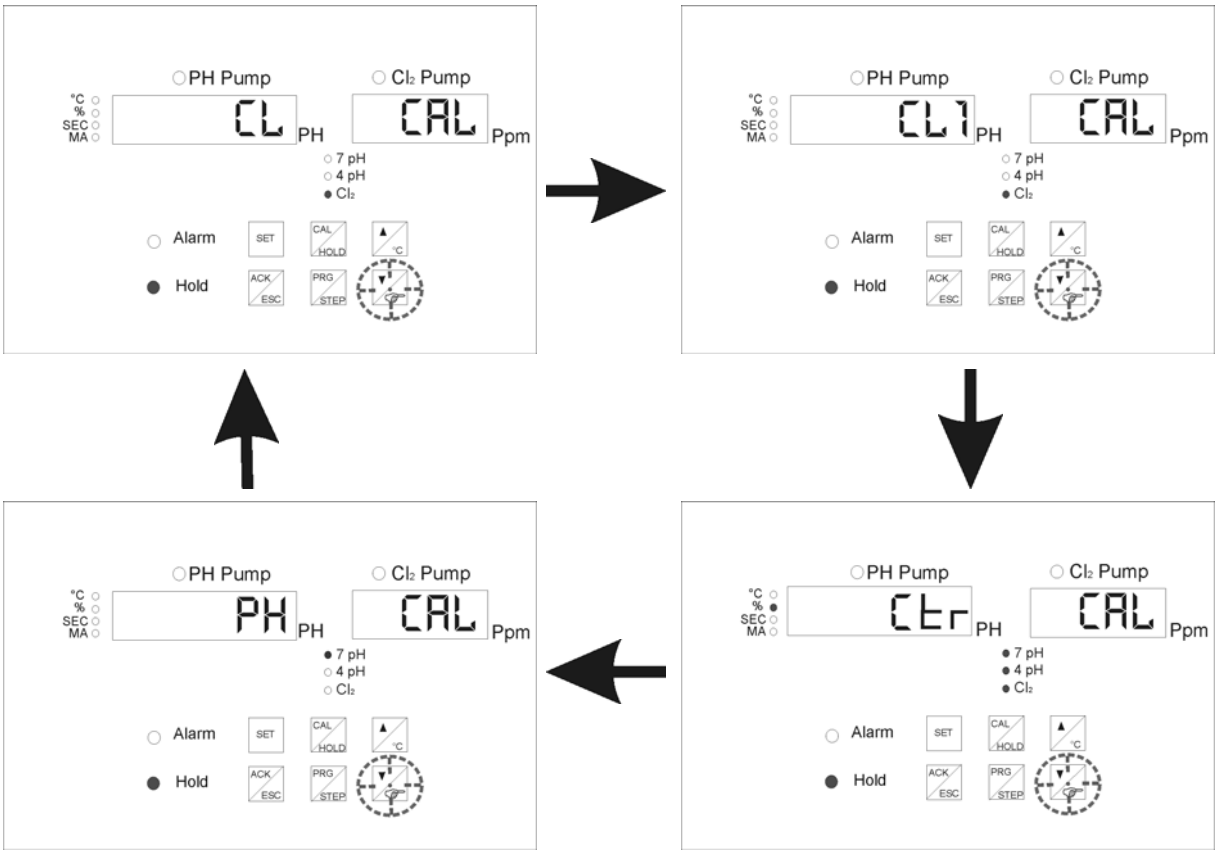

En las explicaciones siguientes de los menús y de las funciones del instrumento se utilizará este símbolo para indicar las teclas a presionar.

## 5___CALIBRACIÓN

Para entrar en el menú Calibración mantener pulsada la tecla CAL/HOLD durante **5 segundos**, el instrumento presenta el mensaje **Hold Cal**, después de dicho tiempo aparece el mensaje **CL CAL** con el **led Hold** encendido.




Utilizando la tecla ▼ seguirán cíclicamente las indicaciones **CL1, CTR, PH, CL.**



## 5.1___CALIBRACIÓN SONDA pH

El electrodo de pH debe ser recalibrado periódicamente hasta que, debido a su excesivo agotamiento, es preciso cambiarlo. La operación de calibración del electrodo es controlada de manera semiautomática por el instrumento PC95, que reconoce de manera automática el valor de de la solución patrón de muestra en la cual está sumergido el electrodo y que visualiza un parámetro de calidad para indicar el grado de agotamiento de la sonda.

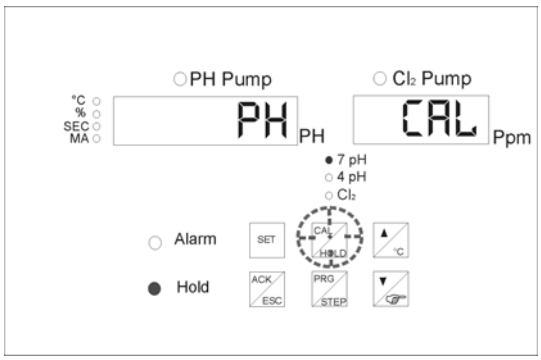
Material necesario para la calibración:

1) **Solución tampón 7 pH bien conservada (FRASCO N° 1)**
2) **Solución tampón 4 ó 9.22 pH bien conservada (FRASCO N° 3)**
3) **Agua limpia para lavar el electrodo (FRASCO N° 2)**

**NOTAS:**
Una solución con **4 pH** es siempre preferible a una solución con **9** ó **10 pH**, se trata de un valor de pH mucho más estable en el tiempo y sobre el cual no influye la temperatura.
Durante la fase de calibración se debe evitar introducir el electrodo en las soluciones tampón sin primero lavarlo cuidadosamente; **no secar el electrodo frotándolo con papel o trapos** sino dejarlo escurrir naturalmente.
Las soluciones tampón se deben guardar siempre en un sitio oscuro y fresco, se debe evitar el uso de soluciones por más de un año.

**PROCESO**

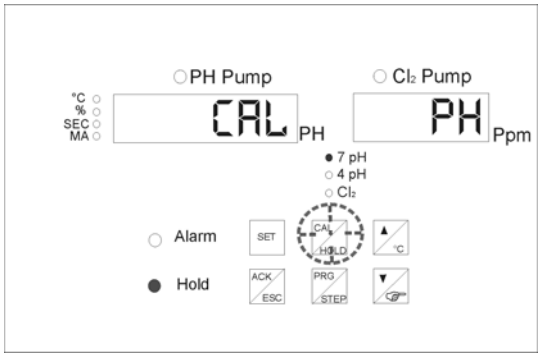
1. Entrar en el menú calibración (**ver pág 8**) y seleccionar la función **PH CAL**




2. Confirmar con la tecla CAL/HOLD para proceder con una calibración de la sonda **pH**.

3. Ahora aparece el mensaje **CAL** intermitente **PH** con el **led 7 pH** intermitente.

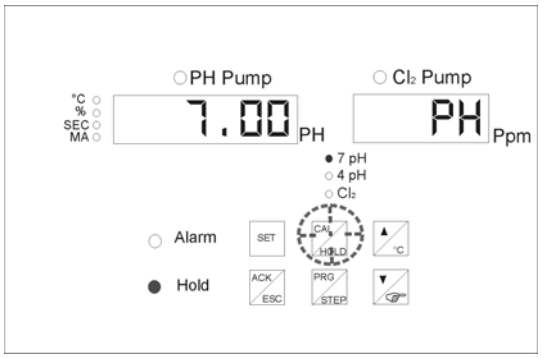
4. Extraer el electrodo de pH del vaso portasondas.




5. Lavar el electrodo en el **frasco n° 2** que contiene **agua limpia**.

6. Sumergir el electrodo en el **frasco n° 1** con la solución **7 pH** por un tiempo de **15 segundos**.

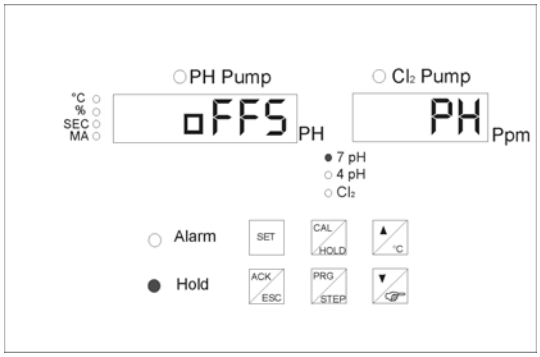
7. Presionar la tecla CAL/HOLD

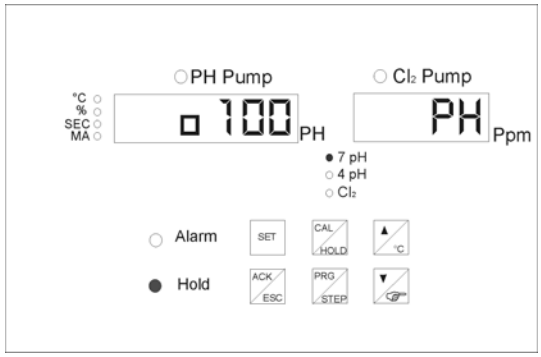



8. En el display aparece el mensaje **7.00** si reconoce la solución tampón.
(En caso de error cambiar la solución tampón)

9. Presionar la tecla CAL/HOLD el valor de la solución tampón es reconocida.

10. Presionar la tecla CAL/HOLD en el display aparece el mensaje **OFFS PH** esperar **30 segundos** para la calibración de la sonda.
El instrumento calcula el valor de **OFFSET** y visualiza la calidad del electrodo en porcentaje.



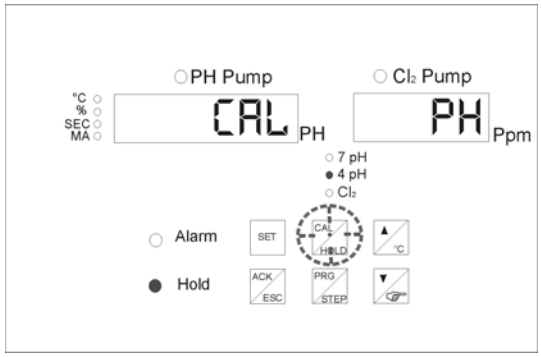




11. Al cabo de 5 segundos en el display aparece el mensaje **CAL PH** y el **led 4 pH** intermitente

12. Lavar el electrodo en el **frasco n° 2** que contiene agua limpia.

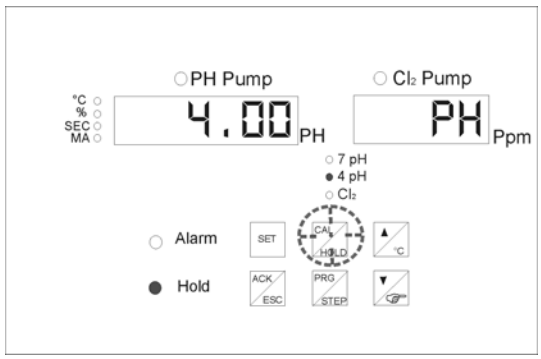
13. Sumergir el electrodo en el **frasco n° 3**

con la solución **4 pH** por un tiempo de **15 segundos**.



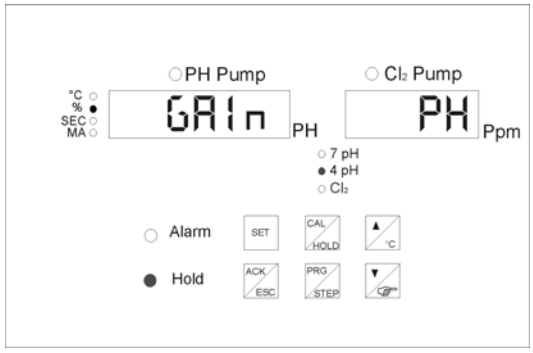

14. Presionar la tecla CAL/HOLD

15. En el display aparece el valor de la solución tampón
reconocida.
(En caso de error cambiar la solución tampón)

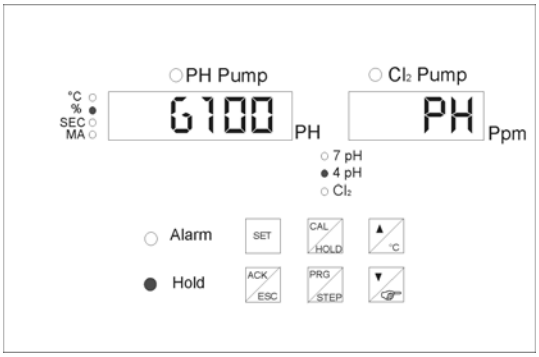



16. Si se utiliza una diferente se debe corregir el valor de la

solución tampón con las teclas ▲/°C ▼

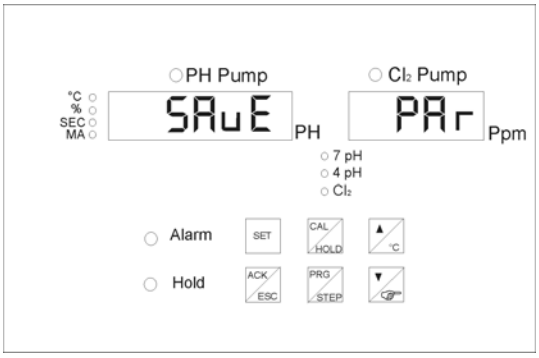


17. Presionar la tecla CAL/HOLD . En el display aparece el mensaje **GAIN PH** esperar **30 segundos** El instrumento calcula el valor de **GAIN** y visualiza la calidad del electrodo en porcentaje.




18. El instrumento guarda los parámetros calculados y visualiza por un segundo en el display **SAVE PAR.**

Sale del menú calibración y regresa al estado de medida, queda activo el estado de **HOLD.**




19. Poner de nuevo el electrodo en el vaso portasondas, abrir de nuevo el flujo del agua ajustándolo en **60 litros/hora**, pulsar la tecla ACK/ESC para eliminar el estado de **HOLD**.

## 5.2___CALIBRACIÓN SONDA CLORO

### 5.2.1___INICIAL

**Esta calibración debe ser ejecutada cada vez que se sustituye el 20% o un porcentaje superior del agua contenida en la piscina.**

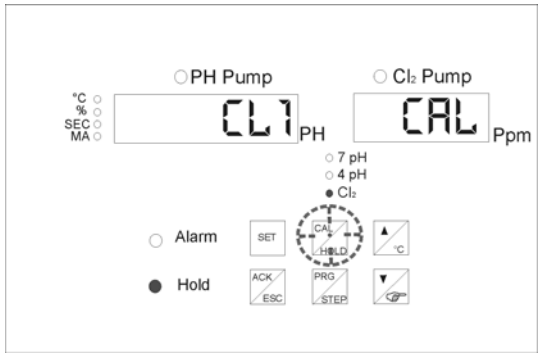
Si la célula de medida es nueva, vaciarla del agua y limpiar bien el electrodo de cobre utilizando el cepillo pequeño provisto **(pág. 29)**, reavivar la superficie en contacto con el agua hasta dejarla brillante, DEJAR CIRCULAR AGUA CLORADA DURANTE 4 HORAS.

**NOTA:** SE DEBE EFECTUAR UNA PRIMERA CALIBRACIÓN DESPUÉS DE QUE LA CÉLULA HA TRABAJADO CON AGUA CLORADA CON UN VALOR INCLUIDO ENTRE **0,7 PPM** Y **1,4 PPM** DURANTE POR LO MENOS **4 HORAS**.

**PROCESO**

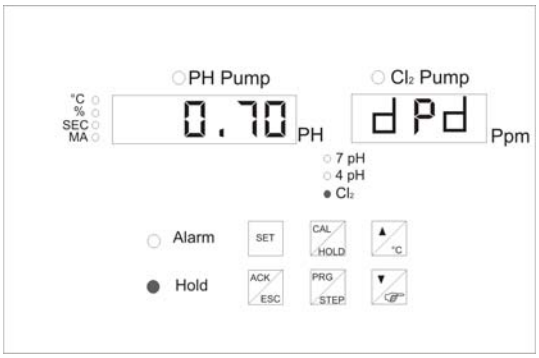
**1.** Coger una muestra de agua clorada por el grifo previsto y determinar el valor de cloro residual libre con un método **DPD**

2. Entrar en el menú calibración (**ver pág 8**) y seleccionar la función **CL1 CAL**.



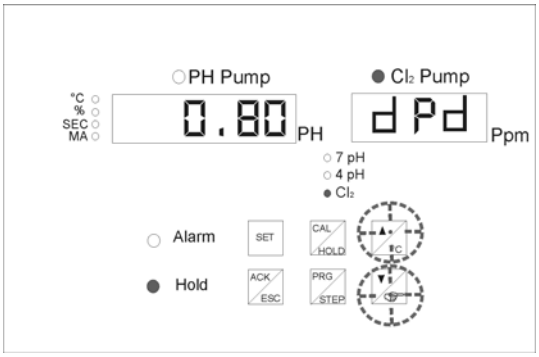

**En el display aparece el mensaje CL1 con CAL el led CL2 intermitente.**

Presionar la tecla CAL/HOLD

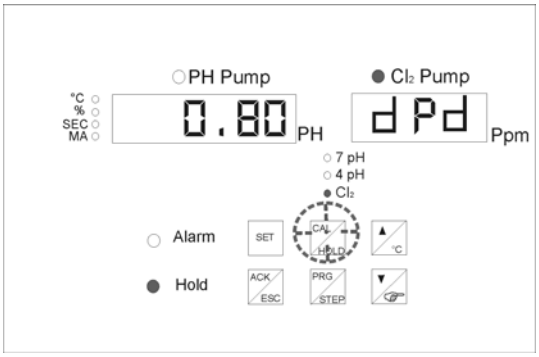



En el display aparece el valor de cloro visualizado en ese momento con el mensaje **DPD**

Con las teclas ▲/°C y ▼ introducir el valor de cloro medido con el método DPD (por ejemplo 0.80 ppm)

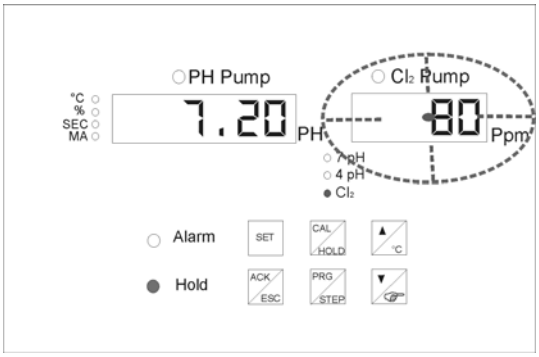



Presionar la tecla CAL/HOLD
La electroválvula es alimentada y cierra el flujo del agua



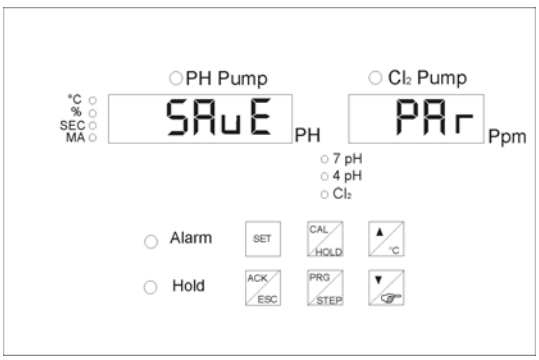

El instrumento comienza un proceso de calibración automática de **un número de medidas proporcional a la concentración registrada:**

Ejemplo: 0.80 ppm = 80 medidas
1,10 ppm = 110 medidas




En el display cloro es mostrado el valor decreciente de las medidas a efectuar, sobre el agua contenida en la sonda.
La electroválvula quedará alimentada por todo el tiempo de calibración.
Durante todo el proceso quedan encendidos el **led HOLD** y el **led $Cl_2$**

El instrumento guarda los parámetros calculados y visualiza por un segundo en el display **SAVE PAR.**
Sale del menú calibración, corta la alimentación para la electroválvula y restablece el flujo.



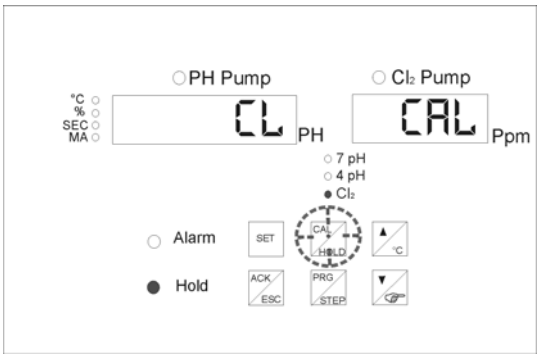
El operador puede abandonar el control del panel ya que la calibración está totalmente automatizada. El tiempo de calibración es de aproximadamente **15 minutos para 1 ppm** de cloro.

**UNA VEZ TERMINADA UNA PRIMERA CALIBRACIÓN Y REGISTRADA LA MEDIDA CORRECTA DE LA CONCENTRACIÓN DE CLORO, NO ES NECESARIO EJECUTAR UNA CALIBRACIÓN PERIÓDICA, EN CASO CONTRARIO PROCEDER CON LA CALIBRACIÓN PERIÓDICA.**

**NOTAS:**
Si en el display aparece el mensaje intermitente **LOW** significa que el instrumento considera el valor de cloro presente en el momento de la calibración insuficiente para efectuar una buena calibración, en todo caso se puede proceder aceptando un cierto margen de error ( <= 10% ).

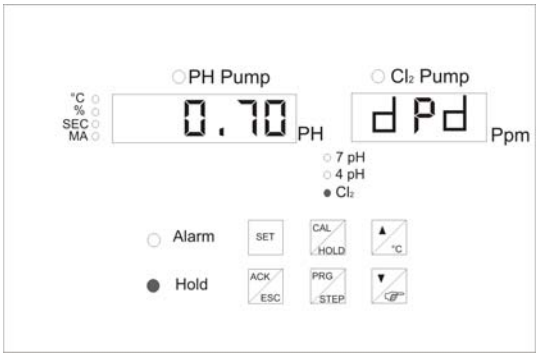
### 5.2.2___PERIÓDICA

Esta función puede ser utilizada para mejorar la medida instrumental.
Coger una muestra de agua clorada por el grifo previsto y determinar el valor de cloro residual libre con un método **DPD**

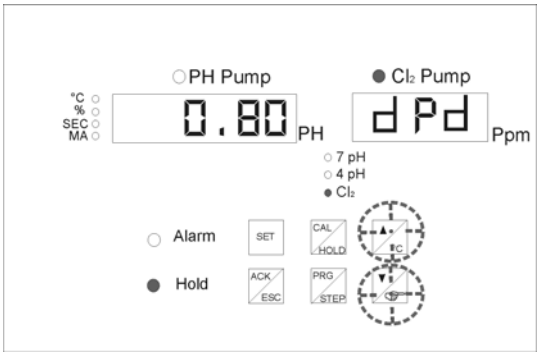



Entrar en el menú calibración (**ver pág 8**) y seleccionar la función **CL CAL.**

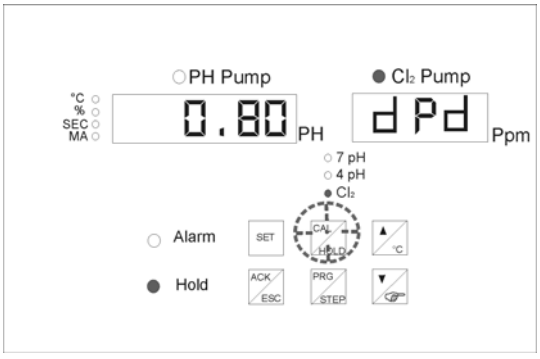
En el display aparece el mensaje **CL** con **CAL** el **led CL2** intermitente**.**




Presionar la tecla CAL/HOLD



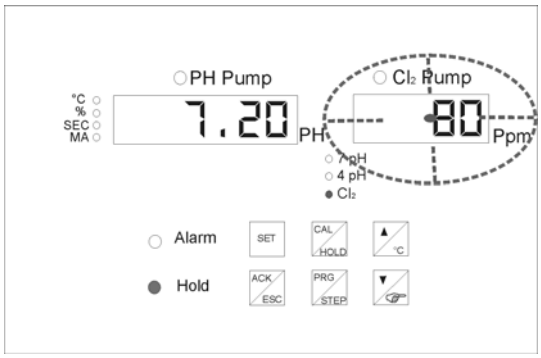

En el display aparece el valor de cloro visualizado en ese momento con el mensaje **DPD**



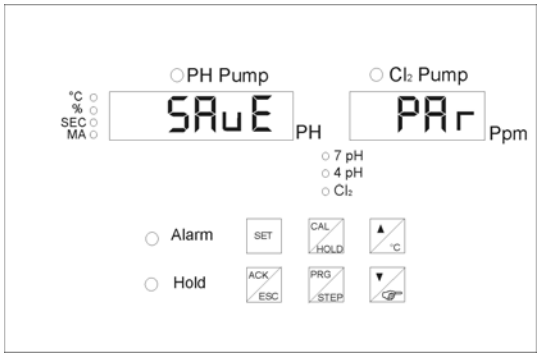

Con las teclas ▲ °C ▼ introducir el valor de cloro medido con el método DPD (por ejemplo 0.80 ppm)

Presionar la tecla CAL/HOLD
La electroválvula es alimentada y cierra el flujo del agua

El instrumento comienza un proceso de calibración automática de **80 medidas**, visualizado en el display, sobre el agua contenida en la sonda.
La electroválvula quedará alimentada por todo el tiempo de
calibración.
Durante todo el proceso quedan encendidos el **led HOLD** y el **led $Cl_2$**




El instrumento guarda los parámetros calculados y visualiza por un segundo en el display **SAVE PAR.**
Sale del menú calibración, corta la alimentación para la electroválvula y restablece el flujo.




Las medidas efectuadas por el instrumento serán proporcionales a la concentración.

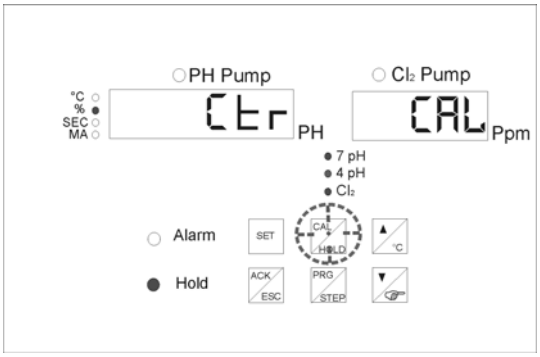
**Ejemplo:** 0.80 ppm = 80 medidas; 1,10 ppm = 110 medidas

El operador puede abandonar el control del panel ya que la calibración está totalmente automatizada. El tiempo de calibración es de aproximadamente **15 minutos para 1 ppm** de cloro. Si en el display aparece el mensaje intermitente **LOW** significa que el instrumento considera el valor de cloro presente en el momento de la calibración insuficiente para efectuar una buena calibración, en todo caso se puede proceder aceptando un cierto margen de error ( <= 10% ).

## 5.3___VERIFICACIÓN SONDAS

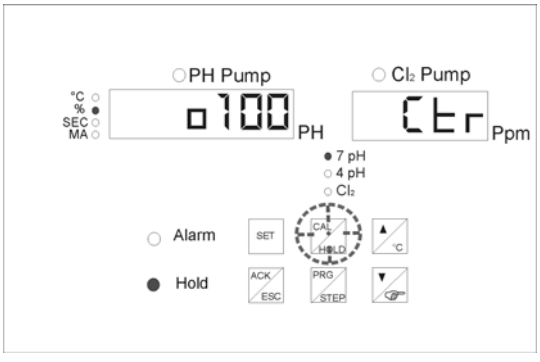
Una vez terminados los procesos de calibración es posible leer los valores, en porcentaje, de la calidad de las sondas calibradas.

Entrar en el menú calibración (**ver pág 8**) y seleccionar la función **Ctr CAL**.



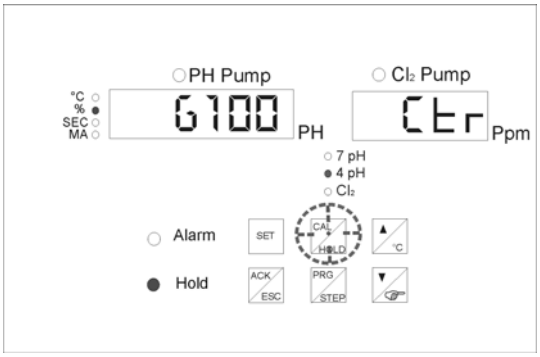

En el display aparece el mensaje **Ctr CAL** con los **led 7pH, 4pH, CL2** intermitentes.

Presionar la tecla

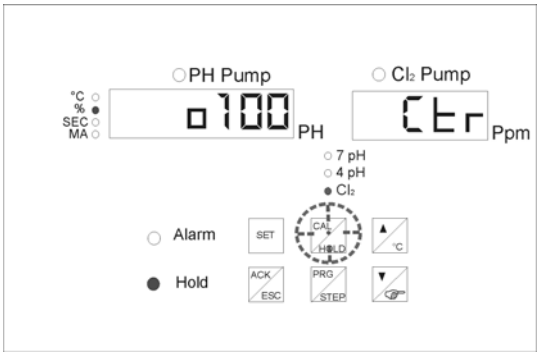

En el display aparece **o100 Ctr** con el **led 7 pH** y **%** encendido el instrumento indica la calidad OFFSET del electrodo pH.

Presionar la tecla CAL/HOLD



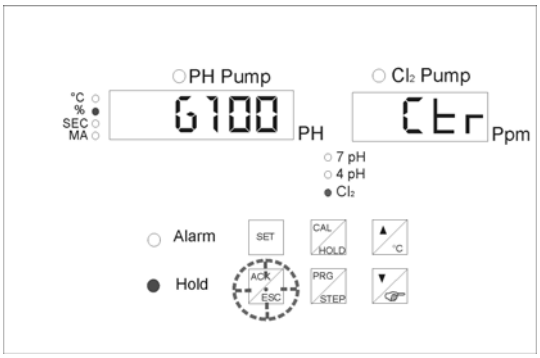

En el display aparece **G100 Ctr** con el **led 4 pH** y **%** encendido el instrumento indica la calidad GAIN del electrodo pH.

Presionar la tecla CAL/HOLD




En el display aparece **o100 Ctr** con el **led $Cl_2$** y **%** encendido el instrumento indica la calidad OFFSET del electrodo Cloro.

Presionar la tecla CAL/HOLD




En el display aparece **G100 Ctr** con el **led $Cl_2$** y **%** encendido el instrumento indica la calidad GAIN del electrodo Cloro.

Para salir del menú presionar la tecla ACK/ESC

Las indicaciones de calidad del electrodo se deben considerar por separado, un grado bajo de calidad en una de las dos indica escasa calidad aunque la otra indicación sea buena.

**ATENCIÓN:** Verificar siempre la calidad de las soluciones de muestra de color homogéneo. Prestar atención en no utilizar soluciones tampón que lleven más de 1 año abiertas.

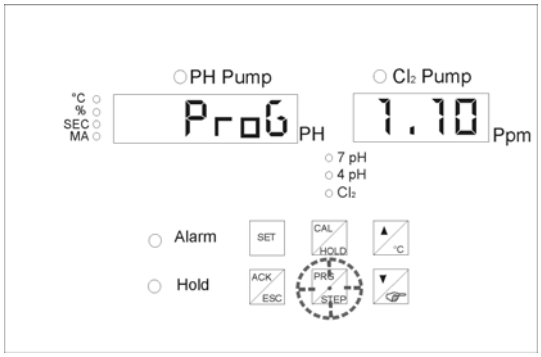
**EJEMPLO:**
Supongamos que en la calibración con 7 pH la calidad resulte ser del 10%, mientras que en la calibración con 4 pH la calidad resulte ser del 98%.

En tal caso es evidente que el elemento de referencia del electrodo se ha estropeado precozmente, este fenómeno por ejemplo es típico en las instalaciones de cloración en que se efectúan cloraciones SHOCK que tienden a contaminar la referencia del electrodo.

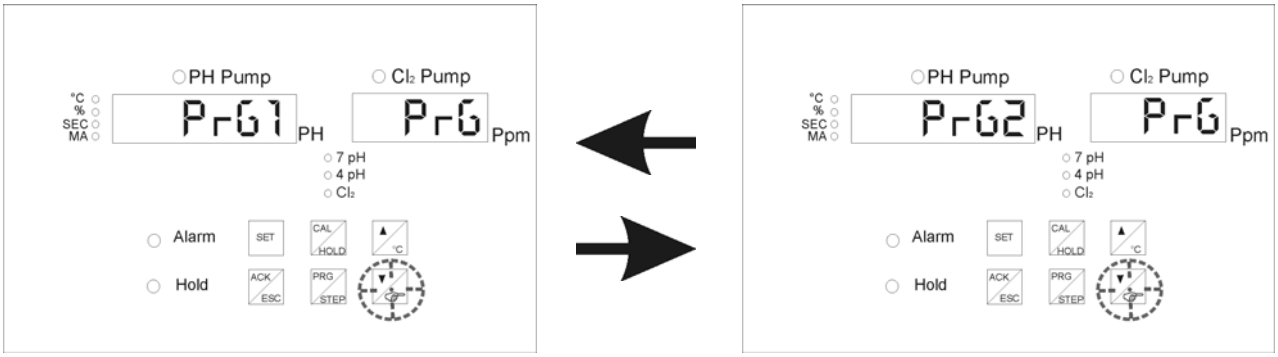
En este caso sería buena norma o cerrar el sistema de medida en la fase de supercloración o utilizar los electrodos previstos de doble barrera, expresamente construidos para no ser perjudicados por el cloro disuelto en el agua.

# 6___MENÚ PROGRAMACIÓN

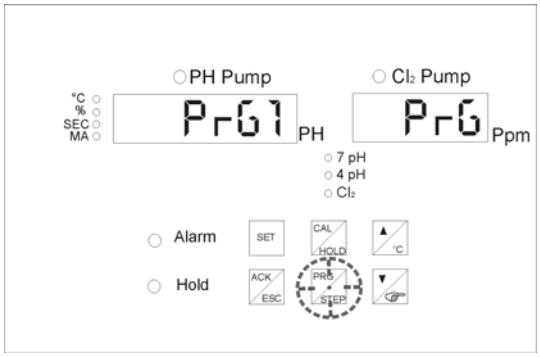
Para acceder al menú programación mantener presionada la tecla PRG/STEP durante **5 segundos** en el display aparece PROG



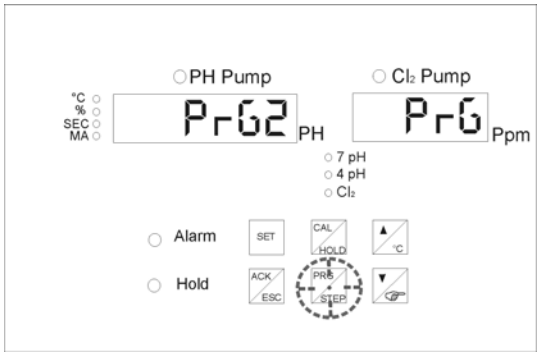

Entrar en la función de programación visualizando la primera indicación **PRG1** mediante la tecla ▼ se pueden recorrer las dos indicaciones cíclicamente **PRG1** y **PRG2**.




Presionando la tecla PRG/STEP con la indicación **PRG1** se accede al menú reducido que se compone de las variables indispensables.




Presionando la tecla PRG/STEP con la indicación **PRG2** se accede al menú completo compuestos de todas las variables.



## 6.1___LISTA DE LAS VARIABLES

### 6.1.1___Menú PRG1

Entrar en el menú programación (**ver pág 16**) y seleccionar la función **PRG1**.
Las variables utilizadas son las siguientes:

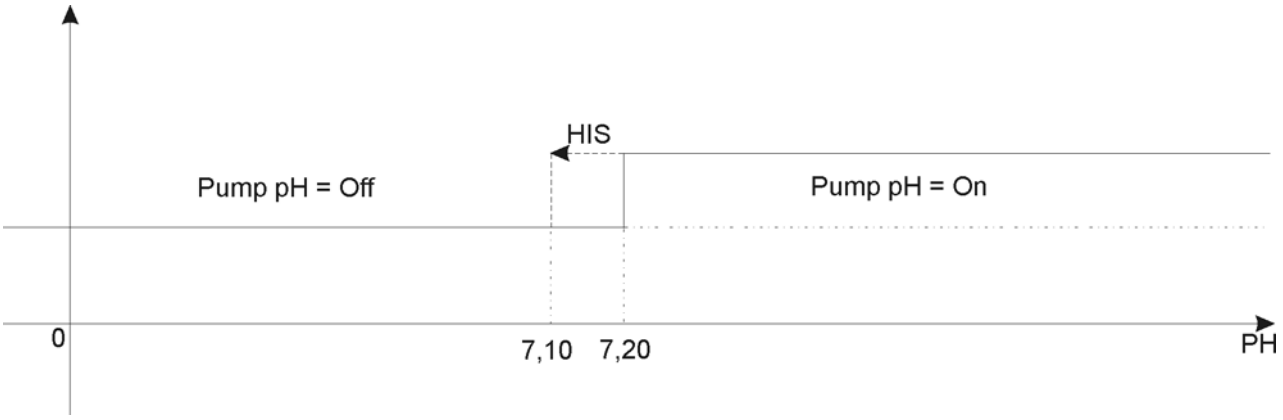
| VARIABLES | LÍMITES CONSENTIDOS | VALORES POR DEFECTO | COMENTARIO |
|---|---|---|---|
| | | | |
| **CONFIGURACIONES PH** | | | |
| SET | 0…14,00 | 7,20 Ph | SET POINT pH |
| ALL | 0…SET | 6,50 pH | Alarma mínimo pH |
| ALH | SET…14,00 | 7,90 pH | Alarma máximo pH |
| REL | ACID/ALCA | ACID | Tipo de regulación |
| HIS | 0,00…1,40 | 0,00 pH | Histéresis pH |
| | | | |
| **CONFIGURACIONES CLORO** | | | |
| SET | 0…5,00 | 0,60 ppm | SET POINT Cloro |
| ALL | 0…SET | 0,30 ppm | Alarma mínimo Cloro |
| ALH | SET…5,00 | 1,50 ppm | Alarma máximo Cloro |
| REL | LO | LO | Tipo de regulación |
| HIS | 0,00…0,50 | 0,00 ppm | histéresis cloro |
| CPH | ON / OFF | OFF | Habil. para la corrección de la medida cloro según el pH |
| **HABILITACIONES** | | | |
| EN | S-/-C/SC/-- | SC | Habilita las teclas Cal y Set |

Configurando estas variables es posible tener una regulación ON / OFF de las bombas de dosificación.

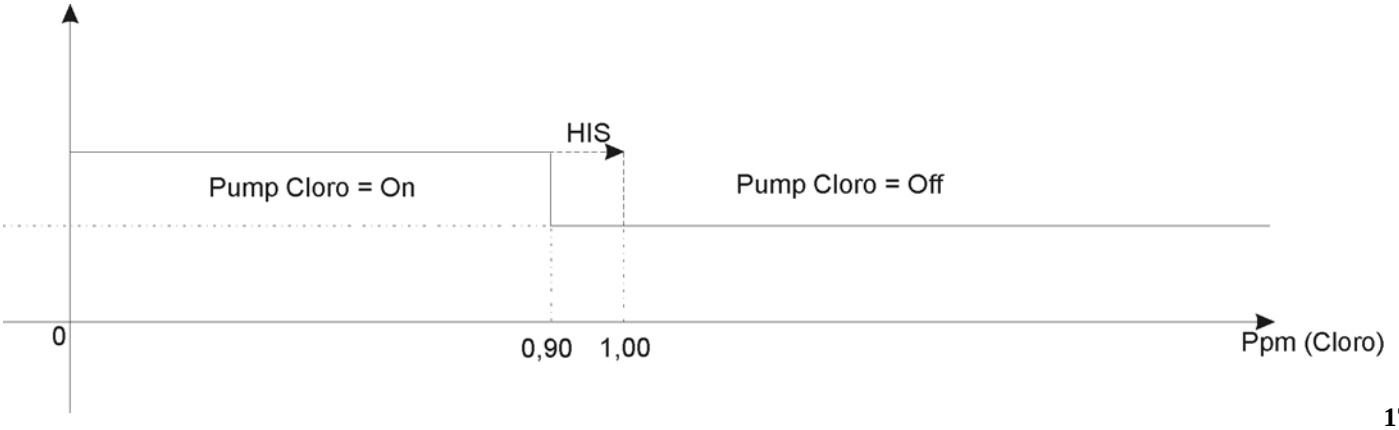
**Ejemplo:**

El gráfico representa una regulación del Set Point de la medida con un valor de histéresis diferente de cero.

SET POINT pH = 7,20 pH (SET)
Histéresis = 0,10 pH (HIS)




SET POINT CL = 0,90 ppm (SET)
Histéresis = 0,10 ppm (HIS)



### 6.1.2___Menú PRG2

Entrar en el menú programación (**ver pág 16**) y seleccionar la función **PRG2**.

Las variables utilizadas son las siguientes:

| VARIABLES | LÍMITES CONSENTIDOS | VALORES POR DEFECTO | COMENTARIO |
|---|---|---|---|
| | | | |
| **CONFIGURACIONES PH** | | | |
| SET | 0…14,00 | 7,20 pH | SET POINT pH |
| ALL | 0…SET | 6,50 pH | Alarma mínimo pH |
| ALH | SET…14,00 | 7,90 pH | Alarma máximo pH |
| REL | ACID/ALCA | ACID | Tipo de regulación |
| PRS | NO / NC | NO | Estado relé pH |
| DEL | 0…255 | 0 Seg. | Tiempo de retraso dos. pH |
| SPM | 20…150 | 20 Imp /min | Impulsos minuto Output Freq. |
| BP | 0,50…2,80 | 0,50 pH | Banda proporcional |
| REG | ONOF/PULS/PROP | ONOF | Modalidad de regulación |
| OUT | MIS/REG | MIS | Modalidad de trabajo Output mA |
| HIS | 0,02…1,40 | 0,00 pH | Histéresis |
| RMA | 0-20/4-20 | 4-20 mA | Dinámica Output en mA |
| MMA | 0,1…5,00 | 0,1 mA | Offset Output mA |
| PHS | 0…10,00 | 0 pH | Valor inicial para reg. mA |
| PHE | PHS…14,00 | 14,00 pH | Valor final para reg. mA |
| Ton | 0…999 seg | 0 Seg. | Tiempo de On (Reg. Puls.) |
| Tof | 0…999 seg | 0 Seg. | Tiempo de Of (Reg. Puls.) |
| BND | 0,00…2,00 Ph | 0,00 pH | Banda de guardia |
| PER | 0…999 seg | 500 Seg | Periodo (Reg. Prop.) |
| MON | 0…255 seg | 0 Seg. | Tiempo mínimo de On |
| DB | 0…10% BP | 0 % de BP | Franja muerta (His. vuelta al revés) |
| **CONFIGURACIONES CLORO** | | | |
| SET | 0…5,00 | 0,60 ppm | SET POINT Cloro |
| ALL | 0…SET | 0,30 ppm | Alarma mínimo Cloro |
| ALH | SET…5,00 | 1,50 ppm | Alarma máximo Cloro |
| REL | LO | LO | Tipo de regulación |
| PRS | NO / NC | NO | Estado relé Cloro |
| DEL | 0…255 | 0 Seg. | Tiempo de retraso dos. Cloro |
| SPM | 20…150 | 20 Imp /min | Impulsos minuto Output Freq. |
| BP | 0,50…2,80 | 0,50 ppm | Banda proporcional |
| REG | ONOF/PULS/PROP | ONOF | Modalidad de regulación |
| OUT | MIS/REG | MIS | Modalidad de trabajo Output mA |
| HIS(*) | 0,02…0,50 | 0,00 ppm | Histéresis |
| RMA | 0-20/4-20 | 4-20 mA | Dinámica Output en mA |
| MMA | 0,1…5,00 | 0,1 mA | Offset Output mA |
| CLS | 0…4,00 | 0 ppm | Valor inicial para reg. mA |
| CLE | PHS…5,00 | 5,00 ppm | Valor final para reg. mA |
| Ton | 0…999 seg | 0 Seg | Tiempo de On (Reg. Puls.) |
| Tof | 0…999 seg | 0 Seg | Tiempo de Of (Reg. Puls.) |
| BND | 0,00…2,00 | 0,00 ppm | Banda de guardia |
| PER | 0…999 seg | 500 Seg. | Periodo (Reg. Prop.) |
| MON | 0…255 seg | 0 Seg. | Tiempo mínimo de On |
| DB | 0…10% BP | 0 % de BP | Banda muerta (His. vuelta al revés) |
| CTP | 0…10 | 0 %/°C | Coeficiente de compensación de la medida según la temperatura expresado en %/°C. |
| CPH | ON / OFF | OFF | Habil. para la corrección de la medida cloro según el pH |
| **HABILITACIONES** | | | |
| EN | S-/-C/SC/-- | SC | Habilita las teclas Cal y Set |
| ID | 1…30 | 1 | Dir. ID red serie multipunto |
| BR | 1200…9600 | 2400 | Baud rate serie RS485 |

# 7___REGULACIONES

## 7.1___ON / OFF

Entrar en el menú programación (**ver pág 16**) y seleccioar la función **PRG2**.

| **VARIABLES** | **VALORES POR DEFECTO** | **COMENTARIO** | |
|---|---|---|---|
| | | | |
| **CONFIGURACIONES PH** | | | |
| | | | |
| | | | |
| SET | 7,20 pH | SET POINT pH | |
| ALL | 6,50 pH | Alarma mínimo pH | |
| ALH | 7,90 pH | Alarma máximo pH | |
| REL | ACID | Tipo de regulación | |
| PRS | NO | Estado relé pH | |
| DEL | 0 Seg | Tiempo de retraso dos. pH | |
| SPM | 20 Seg. | Impulsos minuto Output Freq. | |
| BP | 0,50 pH | Banda proporcional | |
| **REG** | **ONOF** | **Modalidad de regulación** | |
| **OUT** | **MIS / REG** | Modalidad de trabajo Output mA | |
| HIS | 0,00 pH | Histéresis | |
| MMA | 0,1 mA | OFFSET OUTPUT IN mA | |
| RMA | 4-20 mA | Dinámica Output en mA | |
| PHS | 0 pH | Valor inicial para reg. mA | |
| PHE | 14,00 pH | Valor final para reg. mA | |
| | | | |
| **CONFIGURACIONES CLORO** | | | |
| SET | 0,60 ppm | SET POINT Cloro | |
| ALL | 0,30 ppm | Alarma mínimo Cloro | |
| ALH | 1,50 ppm | Alarma máximo Cloro | |
| REL | LO | Tipo de regulación | |
| PRS | NO | Estado relé Cloro | |
| DEL | 0 Seg. | Tiempo de retraso dos. Cloro | |
| SPM | 20 Seg. | Impulsos minuto Output Freq. | |
| BP | 0,50 pH | Banda proporcional | |
| **REG** | **ONOF** | **Modalidad de regulación** | |
| **OUT** | **MIS / REG** | Modalidad de trabajo Output mA | |
| HIS | 0,00 ppm | Histéresis | |
| MMA | 0,1 mA | OFFSET OUTPUT IN mA | |
| RMA | 4-20 mA | Dinámica Output en mA | |
| CLS | 0 ppm | Valor inicial para reg. mA | |
| CLE | 5,00 ppm | Valor final para reg. mA | |
| CTP | 0 %/°C | Coeficiente de compensación de la medida según la temperatura expresado en %/°C. | |
| CPH | OFF | Habil. para la corrección de la medida cloro según el pH | |
| **HABILITACIONES** | | | |
| EN | SC | Habilita las teclas Cal y Set | |
| ID | 1 | Dir. ID red serie multipunto | |
| BR | 2400 | Baud rate serie RS485 | |

Seleccionando dentro del menú la variable **REG = ONOF** y **OUT = MIS** será posible tener las variables antedichas.
Si **OUT = REG** las variables a configurar para el pH y para el CLORO serán sólo las variables subrayadas.

Es la regulación más simple y elemental que se puede efectuar. El dosificador es encendido cuando se sobrepasa la medida del SET POINT y es apagado cuando la medida vuelve por debajo de un cierto valor configurado que es definido como histéresis.
La HISTÉRESIS permite evitar continuas activaciones-desactivaciones del órgano dosificador, una histéresis reducida mejora la regulación pero conlleva un mayor desgaste del dosificador (gráficos en la página 19).

### 7.2___PULS

Entrar en el menú programación (**ver pág 16**) y seleccionar la función **PRG2**.

| **VARIABLES** | **VALORES POR DEFECTO** | **COMENTARIO** | |
|---|---|---|---|
| | | | |
| **CONFIGURACIONES PH** | | | |
| | | | |
| SET | 7,20 pH | SET POINT pH | |
| ALL | 6,50 pH | Alarma mínimo pH | |
| ALH | 7,90 pH | Alarma máximo pH | |
| REL | ACID | Tipo de regulación | |
| PRS | NO | Estado relé pH | |
| DEL | 0 Seg. | Tiempo de retraso dos. pH | |
| SPM | 20 Seg. | Impulsos minuto Output Freq. | |
| BP | 0,50 Seg. | Banda proporcional | |
| **REG** | **PULS** | **Modalidad de regulación** | |
| OUT | MIS | Modalidad de trabajo Output mA | |
| HIS(*) | 0,00 pH | Histéresis | |
| Ton | 0 Seg. | Tiempo de On (Reg. Puls.) | |
| Tof | 0 Seg. | Tiempo de Of (Reg. Puls.) | |
| BND | 0,00 pH | Banda de guardia | |
| RMA | 4-20 mA | Dinámica Output en mA | |
| PHS | 0 pH | Valor inicial para reg. mA | |
| PHE | 14,00 pH | Valor final para reg. mA | |
| | | | |
| **CONFIGURACIONES CLORO** | | | |
| SET | 0,60 ppm | SET POINT Cloro | |
| ALL | 0,30 ppm | Alarma mínimo Cloro | |
| ALH | 1,50 ppm | Alarma máximo Cloro | |
| REL | LO | Tipo de regulación | |
| PRS | NO | Estado relé Cloro | |
| DEL | 0 Seg. | Tiempo de retraso dos. Cloro | |
| SPM | 20 Seg. | Impulsos minuto Output Freq. | |
| BP | 0,50 ppm | Banda proporcional | |
| **REG** | **PULS** | **Modalidad de regulación** | |
| OUT | MIS | Modalidad de trabajo Output mA | |
| HIS | 0,00 ppm | Histéresis | |
| Ton | 0 Seg. | Tiempo de On (Reg. Puls.) | |
| Tof | 0 Seg. | Tiempo de Of (Reg. Puls.) | |
| BND | 0,00 ppm | Franja de guardia | |
| RMA | 4-20 mA | Dinámica Output en mA | |
| CLS | 0 ppm | Valor inicial para reg. mA | |
| CLE | 5,00 ppm | Valor final para reg. mA | |
| CTP | 0 %/°C | Coeficiente de compensación de la medida según la temperatura expresado en %/°C. | |
| CPH | OFF | Habil. para la corrección de la medida cloro según el pH | |
| **HABILITACIONES** | | | |
| EN | SC | Habilita las teclas Cal y Set | |
| ID | 1 | Dir. ID red serie multipunto | |
| BR | 2400 | Baud rate serie RS485 | |

Seleccionando dentro del menú la variable **REG = PULS** será posible tener las variables antedichas.

En la regulación PULS tenemos tres variables fundamentales a configurar y son:
1) **Ton**
2) **Tof**
3) **BND**

Estas tres variables nos permiten ajustar la dosificación en la modalidad tiempo dentro de dos puntos:
para el pH entre el **Set Point** y el **Set Point más la banda de guardia (BND)**
para el Cloro entre el **Set Point** y el **Set Point menos la banda de guardia (BND)**
**Ejemplo:**
Si configuramos un **Set Point pH** = 7,20 pH y una banda de guardia **BND** = 0,20 pH podemos ajustar con un tiempo de **Ton** y **Tof** entre 7,20 pH y 7,40 pH.

Si configuramos un **Set Point cloro** = 1,00 ppm de cloro y una franja de guardia **BND** = 0,30 podemos ajustar con un tiempo de **Ton** y **Tof** entre 0,70 ppm y 1,00 ppm.

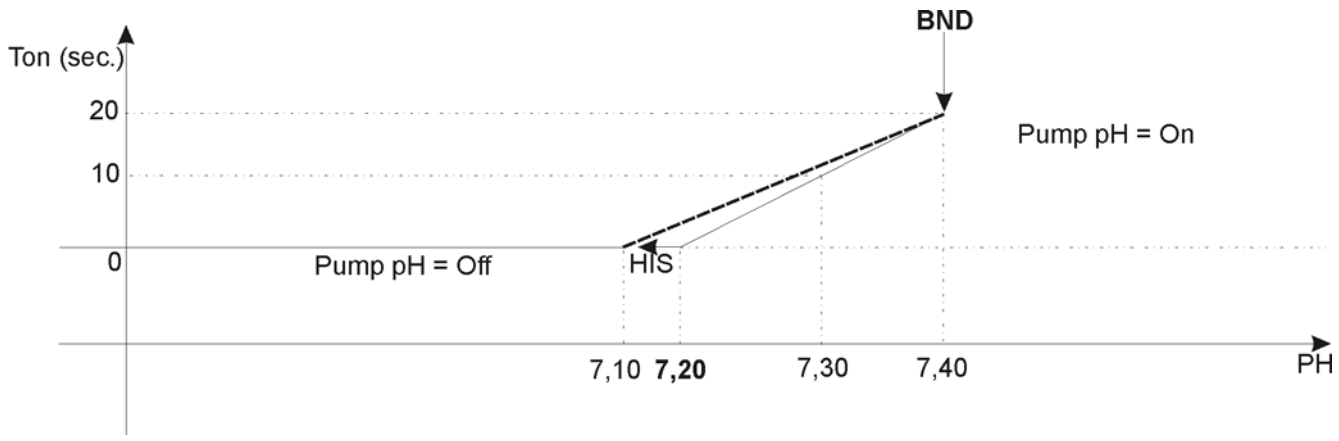
Las regulaciones consentidas dentro de este intervalo son dos:

1) **Ton y Tof con valores diferentes**
Ejemplo: Ton = 10 seg Tof = 5 seg.
El tiempo de dosificación de la bomba será, siempre encendida por 10 seg y apagada por 5 seg. Dentro de la franja configurada.

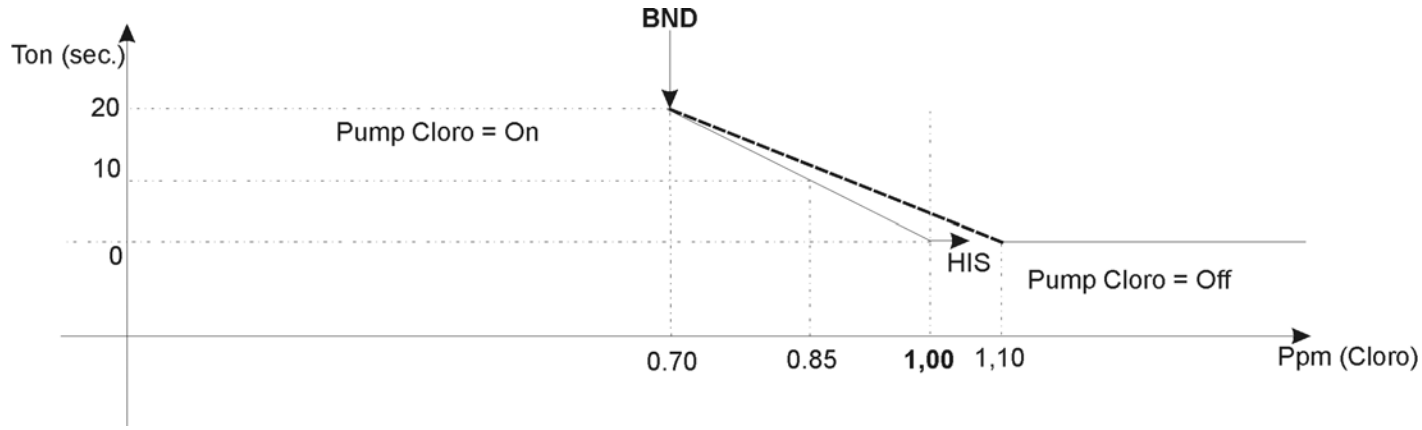
2) **Ton y Tof con valores iguales**
Ejemplo: Ton = 10 seg Tof = 10 seg.
El tiempo de dosificación de la bomba será **proporcional en el tiempo** al acercarse al Set Point dentro de la franja configurada.

**Ejemplo proporcional:**
En los gráficos presentados a continuación se describe la regulación proporcional antedicha; además se ha representado con una línea punteada la regulación que se tendría si el operador configurara un valor de histéresis (HIS).

Set Point = 7,20 pH
**HIS = 0.10 pH (la regulación es la línea punteada)**
Ton = 10 Seg.
Tof = 10 Seg.
BND = 0.20 pH



Set Point = 1,00 ppm
**HIS = 0.10 ppm (la regulación es la línea punteada**
Ton = 10 Seg.
Tof = 10 Seg.
BND = 0,30 ppm



## 7.3___PROP

Entrar en el menú programación (**ver pág 16**) y seleccionar la función **PRG2**.

| **VARIABLES** | **VALORES POR DEFECTO** | **COMENTARIO** | |
|---|---|---|---|
| | | | |
| **CONFIGURACIONES PH** | | | |
| SET | 7,20 pH | SET POINT Ph | |
| ALL | 6,50 pH | Alarma mínimo pH | |
| ALH | 7,90 pH | Alarma máximo pH | |
| REL | ACID | Tipo de regulación | |
| PRS | NO | Estado relé pH | |
| DEL | 0 Seg. | Tiempo de retraso dos. PH | |
| SPM | 20 Imp /min | Impulsos minuto Output Freq. | |
| BP | 0,50 pH | Banda proporcional | |
| **REG** | **PROP** | Modalidad de regulación | |
| OUT | MIS | Modalidad de trabajo Output mA | |
| PER | 500 Seg | Periodo (Reg. Prop.) | |
| MON | 0 Seg | Tiempo mínimo de On | |
| DB | 0 % de BP | Banda muerta (His. vuelta al revés) | |
| RMA | 4-20 mA | Dinámica Output en mA | |
| PHS | 0 pH | Valor inicial para reg. mA | |
| PHE | 14,00 pH | Valor final para reg. mA | |
| | | | |
| **CONFIGURACIONES CLORO** | | | |
| SET | 0,60 ppm | SET POINT Cloro | |
| ALL | 0,30 ppm | Alarma mínimo Cloro | |
| ALH | 1,50 ppm | Alarma máximo Cloro | |
| REL | LO | Tipo de regulación | |
| PRS | NO | Estado relé Cloro | |
| DEL | 0 Seg. | Tiempo de retraso dos. Cloro | |
| SPM | 20 Imp /min | Impulsos minuto Output Freq. | |
| BP | 0,50 ppm | Banda proporcional | |
| **REG** | **PROP** | Modalidad de regulación | |
| OUT | MIS | Modalidad de trabajo Output mA | |
| PER | 500 Seg. | Periodo (Reg. Prop.) | |
| MON | 0 Seg. | Tiempo mínimo de On | |
| DB | 0 % de BP | Banda muerta (His. vuelta al revés) | |
| RMA | 4-20 mA | Dinámica Output en mA | |
| CLS | 0 ppm | Valor inicial para reg. mA | |
| CLE | 5 ppm | Valor final para reg. mA | |
| CTP | 0 %/°C | Coeficiente de compensación de la medida según la temperatura expresado en %/°C. | |
| CPH | OFF | Habil. para la corrección de la medida cloro según el pH | |
| | | | |
| **HABILITACIONES** | | | |
| EN | SC | Habilita las teclas Cal y Set | |
| ID | 1 | Dir. ID red serie multipunto | |
| BR | 2400 | Baud rate serie RS485 | |

La regulación proporcional de tiempo permite seguir rápidamente la variación de la medida, optimizando la dosificación según la distancia con respecto al Set Point.
Este tipo de regulación está aconsejado para los sistemas bien mezclados y permite un buen grado de regulación, se presta muy bien tanto para el control del pH como para él del cloro.

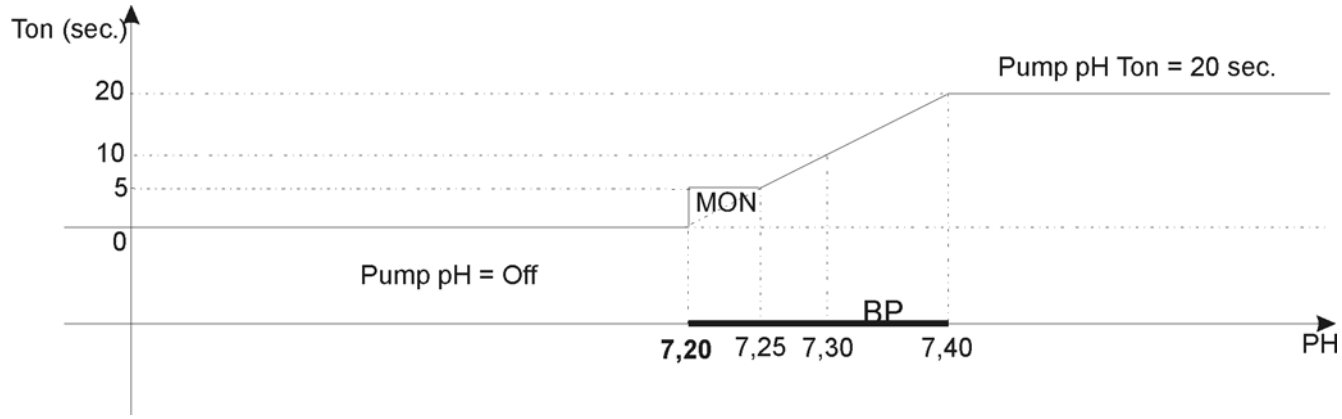
Una vez elegido el tiempo del periodo de modulación del Ton y del Toff, se aconseja mantener bajo control las medidas para el primer periodo de trabajo a fin de optimizar los tiempos.
El valor mínimo de Ton **MON** permite acercarse al SET POINT con un grado de dosificación suficiente para hacerlo sobrepasar, de lo contrario, en las cercanías del set la bomba podría marchar siempre al mínimo sin parar nunca.

**Ejemplo:**

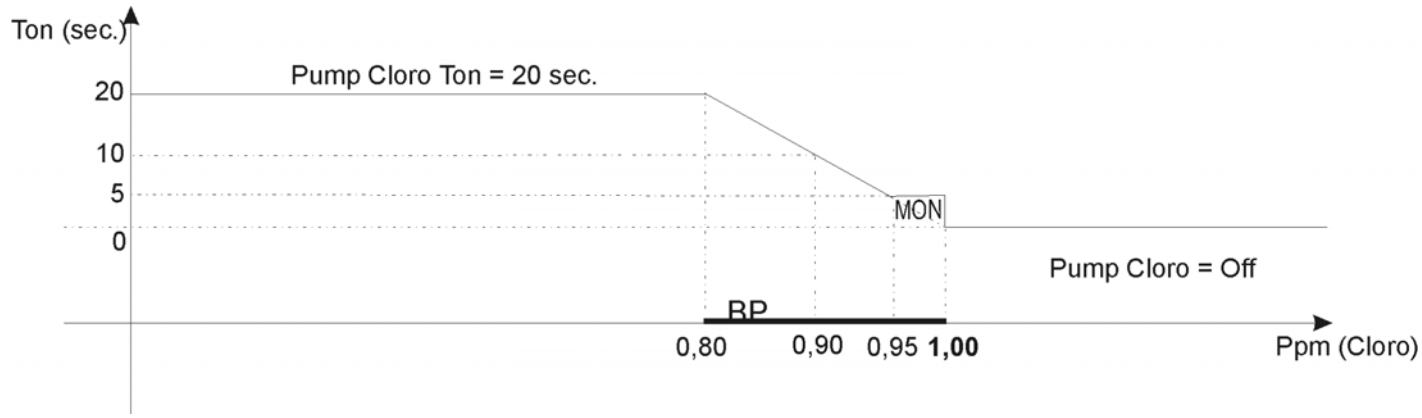
Configurando los siguientes valores se conseguirá una regulación proporcional en el tiempo con un mínimo de Ton de la bomba dosificadora alrededor del Set Point.

| **VARIABLES** | **VALORES DE DEFAULT** | **COMENTARIO** | |
|---|---|---|---|
| | | | |
| **CONFIGURACIONES PH** | | | |
| **SET** | **7,20 pH** | **SET POINT pH** | |
| ALL | 6,50 pH | Alarma mínimo pH | |
| ALH | 7,90 pH | Alarma máximo pH | |
| REL | ACID | Tipo de regulación | |
| **BP** | **0.20 pH** | **Franja proporcional** | |
| **REG** | **PROP** | Modalidad de regulación | |
| OUT | MIS | Modalidad de trabajo Output mA | |
| **PER** | **20 Seg.** | **Periodo (Reg. Prop.)** | |
| **MON** | **5 Seg.** | **Tiempo mínimo de On** | |

**Nota:** No es posible configurar la histéresis (**HIS**) y el tiempo de retraso (**DEL**) de activación de la bomba.

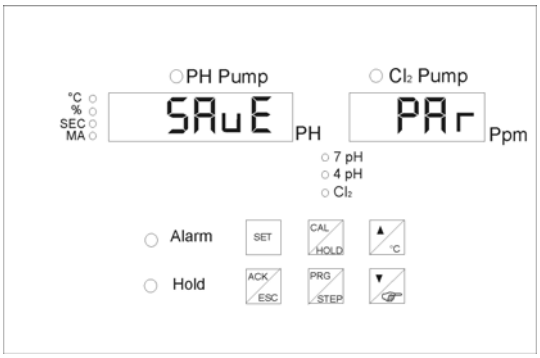



| **CONFIGURACIONES CLORO** | | | |
|---|---|---|---|
| **SET** | **1.00 ppm** | **SET POINT Cloro** | |
| ALL | 0,60 ppm | Alarma mínimo Cloro | |
| ALH | 1,50 ppm | Alarma máximo Cloro | |
| **BP** | **0.20 ppm** | **Franja proporcional** | |
| **REG** | **PROP** | Modalidad de regulación | |
| OUT | MIS | Modalidad de trabajo Output mA | |
| **PER** | **20 Seg.** | **Periodo (Reg. Prop.)** | |
| **MON** | **5 Seg.** | **Tiempo mínimo de On** | |



## 7.4___SALVAGUARDIA PARÁMETROS

Para guardar los parámetros configurados en el menú de programación presionar la tecla ACK/ESC durante **5 segundos** y esperar el mensaje **SAVE PAR.**




## 7.5___ REGULACIÓN PROPORCIONAL EN CORRIENTE

La regulación proporcional en corriente es siempre posible en todas las regulaciones mediante las variables:

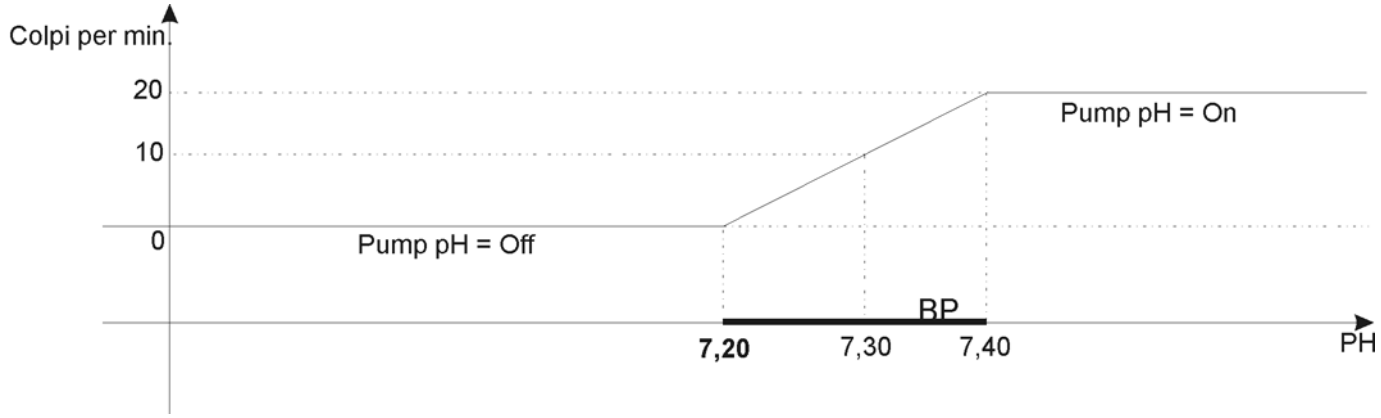
| | | | |
|---|---|---|---|
| PHS | 0 pH | Valor inicial para reg. mA | |
| PHE | 14,00 pH | Valor final para reg. mA | |
| CLS | 0 pH | Valor inicial para reg. mA | |
| CLE | 14,00 pH | Valor final para reg. mA | |

Mediante la variable **RMA = 0-20 mA** ó **4-20 mA** es posible configurar la dinámica de la salida en corriente.
Para poder ajustarla es necesario tener una bomba con entrada en corriente **0-20 mA** ó **4-20 mA.**
La salida en corriente se puede utilizar también para registrador de papel.
El valor mínimo de corriente **MMA** permite acercarse al SET POINT con un grado de dosificación suficiente para hacerlo sobrepasar, de lo contrario, cerca del set la bomba podría marchar siempre al mínimo sin pararse nunca.

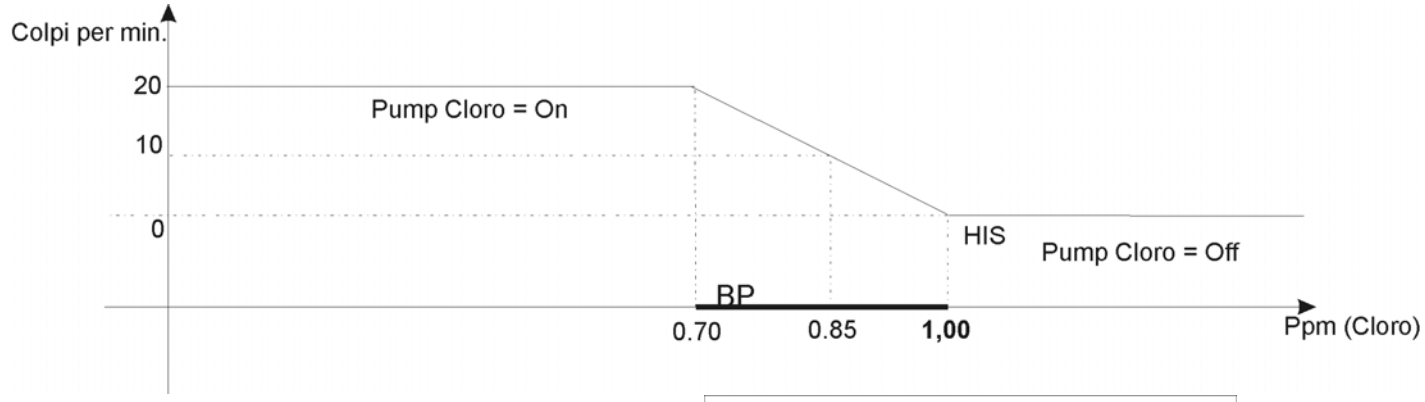
## 7.6___ REGULACIÓN PROPORCIONAL POR IMPULSOS

Mediante las salidas 20, 21 (conexión bomba pH) 22, 23 (conexión bomba cloro), descritas en la página 4 es posible conectar una bomba dosificadora controlada con impulsos por minuto.
Configurando el parámetro **SPM** pH y Cloro, presente en el menú de programación PRG2, y la banda proporcional (BP) es posible ajustar con unos impulsos proporcionales a la variación de la medida.

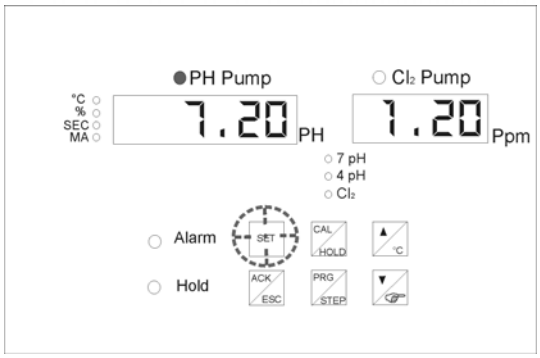
**Ejemplo:**
Set Point = 7,20 pH
SPM pH = 20 impulsos
BP pH = 0.20 pH

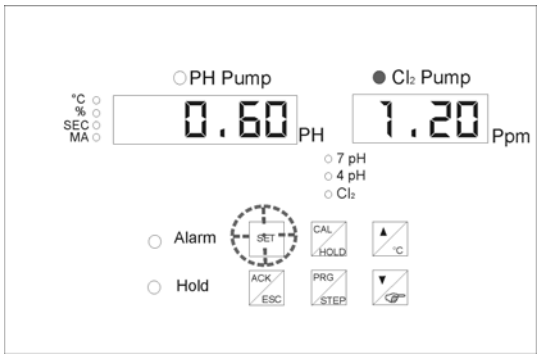


Set Point = 1,00 ppm
SPM Cloro = 20 impulsos
BP Cloro = 0.20 ppm




**NOTA:** El parámetro **SPM** no debe ser mayor que el número máximo de impulsos por minuto aceptado por la bomba.




### 7.7___ FUNCIÓN SET POINT

Con la tecla SET se permite al usuario visualizar cíclicamente los **SET POINT** y modificarlos con las teclas °C sin tener que entrar en la programación.
Si se efectúa la protección en bornera y en el paso **EN** se ha programado **–C** o **--** con la tecla SET es posible sólo visualizar los **SET POINT** sin poder modificarlos.

### 7.8___REGULACIÓN MANUAL Y CEBADO DE LAS BOMBAS.

Con la tecla mantenida pulsada, permite activar en secuencia los relés de comando de las bombas pH y cloro, presionando al mismo tiempo con la tecla SET .
Esta función es de utilidad para operaciones de cebado de las bombas.

### 7.9___ALARMA FLUJO

En los bornes **13** y **14** hay conectada una sonda de nivel situada en el rebosador piezométrico del POOL TOP, si se produce una bajada del flujo del agua tal que perjudique la medida, el instrumento actúa bloqueando la cloración y generando una alarma.
La alarma de flujo se activa si la falta de nivel de agua permanece activa durante **40 segundos**, en tal caso, además de ver el led Alarma intermitente en el display de medida del pH, el mensaje **FLUS** se alterna a la visualización de la medida.
**NOTA:** En el estado de alarma flujo las salidas en corriente son forzadas a 0 mA.

## 7.10___PROTECCIÓN DE LA PROGRAMACIÓN

La programación de los parámetros se puede proteger realizando un puente en la bornera, entre los bornes **12** y **14**.
De esta manera no es posible modificar los datos de trabajo del instrumento.
Si se presiona la tecla PRG/STEP en el display, en lugar del mensaje **PROG** aparece el mensaje **DIS** para indicar que dicha función está inhabilitada.
La protección de la programación está ligada al paso **En** donde se pueden habilitar las funciones de configuración del **SET** y de calibración aunque la programación esté protegida.

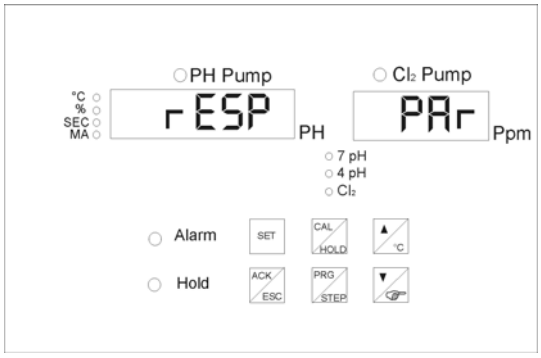
**EN S- / -C / SC / --**

Función de habilitación de los niveles bajos de programación cuando es efectuada una protección en la bornera.

**S-**: La tecla **SET** queda activa.
**-C**: la tecla **CAL** queda activa.
**SC**: Las teclas **SET** y **CAL** quedan activas.
**--**: Ninguna tecla queda activa.

**NOTA:** Los bornes **12** y **14** se pueden conectar con un interruptor con llave exterior, que permite la habilitación del instrumento sólo por parte de personal autorizado.

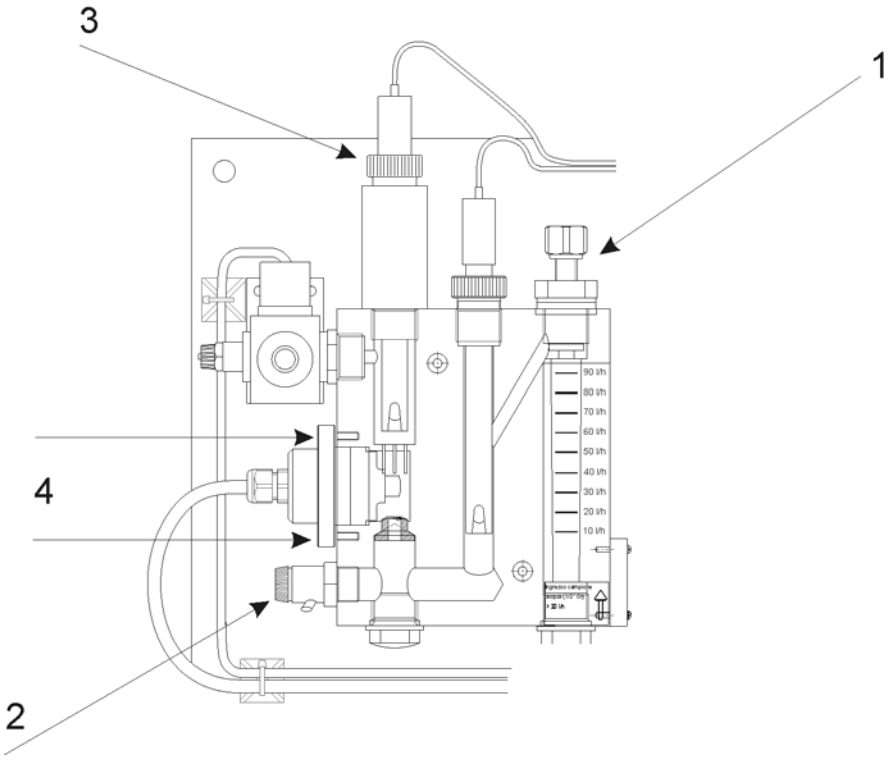
## 7.11___RESET PARÁMETROS




Para eliminar las viejas calibraciones y restablecer los parámetros predeterminados de fábrica en el menú de programación, efectuar las operaciones siguientes:
apagar el instrumento
presionar la tecla PRG/STEP hasta visualizar el mensaje **RESP PAR**
presionar la tecla CAL/HOLD dentro de 10 segundos.
El instrumento visualiza **Save par**.

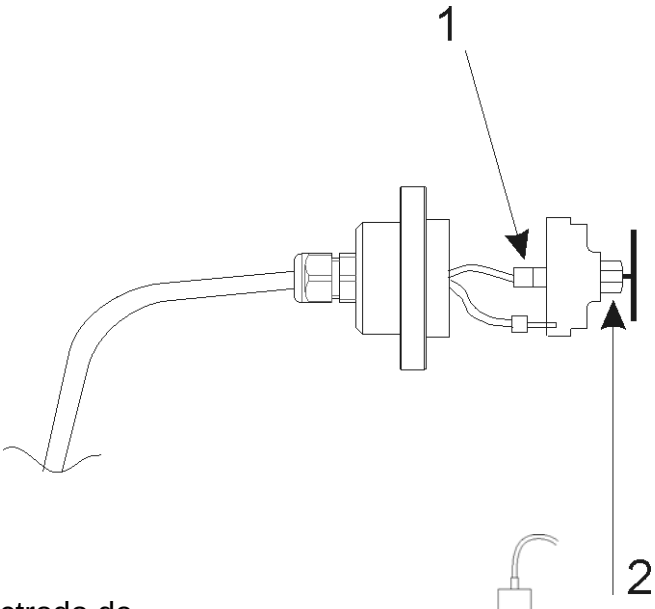
## 7.12___MANTENIMIENTO Y LIMPIEZA DE LA SONDA CLORO

**<u>Cuidado en no hacer caer las bolitas de vidrio contenidas dentro de la sonda.</u>**




Efectuar las siguientes operaciones:

1. Cerrar el flujo del agua
2. Abrir el grifo para vaciar el circuito.
3. Desenroscar la sonda pH para facilitar el vaciado del circuito.
4. Cuando el circuito está vacío, desenroscar y sacar la sonda cloro, <u>prestar suma atención en no hacer caer las bolitas de vidrio.</u>




**Limpieza del electrodo de Cobre:**

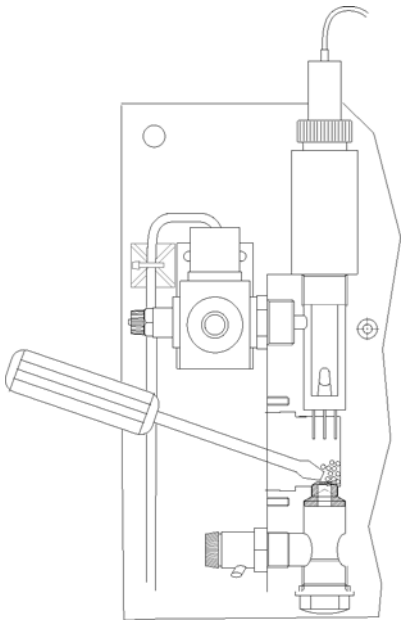
1. Desconectar el fastom (conexión electrodo Platino)
2. Desenroscar el electrodo

Prestar atención en no deformar la espira de platino; guardar en un sitio seguro.
Frotar el electrodo de cobre con el cepillo pequeño incluido en el kit de instalación, hasta dejarlo brillante.
Terminada la operación montar de nuevo las piezas prestando atención en no deformar el electrodo de platino.

**Cambio bolas de vidrio.**

Para cambiar las bolas de viario efectuar las siguientes operaciones:

1. Mojar con agua las bolas incluidas en el suministro
2. Utilizar un destornillador con punta plana para ponerlas dentro de la sonda.
3. Al final de las operaciones cerrar la sonda en todas sus partes.



## 8___MEMO DE PROGRAMACIÓN

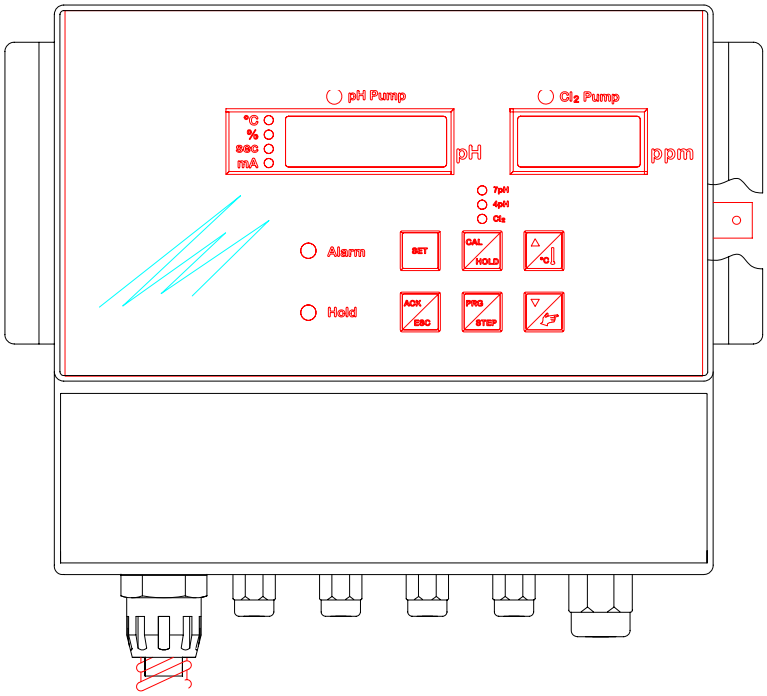
| VARIABLES | VALORES POR DEFECTO | Configuraciones | COMENTARIO |
|---|---|---|---|
| | | | |
| **CONFIGURACIONES PH** | | | |
| SET | 7,20 pH | | SET POINT pH |
| ALL | 6,50 pH | | Alarma mínimo pH |
| ALH | 7,90 pH | | Alarma máximo pH |
| REL | ACID | | Tipo de regulación |
| PRS | NO | | Estado relé pH |
| DEL | 0 Seg. | | Tiempo de retraso dos. pH |
| SPM | 20 Imp /min | | Impulsos minuto Output Freq. |
| BP | 0,50 pH | | Banda proporcional |
| REG | ONOF | | Modalidad de regulación |
| OUT | MIS | | Modalidad de trabajo Output mA |
| HIS | 0,00 pH | | Histéresis pH |
| RMA | 4-20 mA | | Dinámica Output en mA |
| MMA | 0,1 mA | | Offset Output mA |
| PHS | 0 pH | | Valor inicial para reg. mA |
| PHE | 14,00 pH | | Valor final para reg. mA |
| Ton | 0 Seg | | Tiempo de On (Reg. Puls.) |
| Tof | 0 Seg. | | Tiempo de Of (Reg. Puls.) |
| BND | 0,00 pH | | Banda de guardia |
| PER | 500 Seg. | | Periodo (Reg. Prop.) |
| MON | 0 Seg. | | Tiempo mínimo de On |
| DB | 0 % de BP | | Banda muerta (His. vuelta al revés) |
| | | | |
| **CONFIGURACIONES CLORO** | | | |
| SET | 0,60 ppm | | SET POINT Cloro |
| ALL | 0,30 ppm | | Alarma mínimo Cloro |
| ALH | 1,50 ppm | | Alarma máximo Cloro |
| REL | LO | | Tipo de regulación |
| PRS | NO | | Estado relé Cloro |
| DEL | 0 Seg | | Tiempo de retraso dos. Cloro |
| SPM | 20 Imp /min | | Impulsos minuto Output Freq. |
| BP | 0,50 pH | | Banda proporcional |
| REG | ONOF | | Modalidad de regulación |
| OUT | MIS | | Modalidad de trabajo Output mA |
| HIS | 0,00 ppm | | Histéresis |
| RMA | 4-20 mA | | Dinámica Output en mA |
| MMA | 0,1 mA | | Offset Output mA |
| CLS | 0 ppm | | Valor inicial para reg. mA |
| CLE | 5,00 ppm | | Valor final para reg. mA |
| Ton | 0 Seg. | | Tiempo de On (Reg. Puls.) |
| Tof | 0 Seg | | Tiempo de Of (Reg. Puls.) |
| BND | 0,00 ppm | | Banda de guardia |
| PER | 500 Seg | | Periodo (Reg. Prop.) |
| MON | 0 Seg | | Tiempo mínimo de On |
| DB | 0 % de BP | | Franja muerta (His. vuelta al revés) |
| CTP | 0 %/°C | | Coeficiente de compensación de la medida según la temperatura expresado en %/°C. |
| CPH | OFF | | Habil. para la corrección de la medida cloro según el pH |
| | | | |
| **HABILITACIONES** | | | |
| EN | SC | | Habilita las teclas Cal y Set |
| ID | 1 | | Dir. ID red serie multipunto |
| BR | 2400 | | Baud rate serie RS485 |

# Instruction Manual

## PC95

pH – chlorine – temperature

**(Cod. 0000136317)**

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Version: r 2.0

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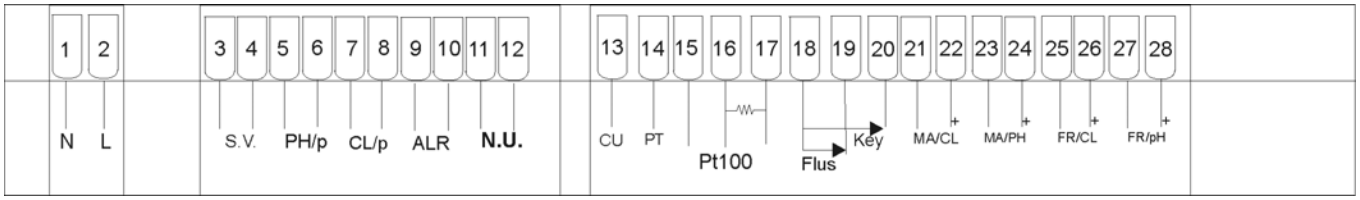
# 1___TECHNICAL SPECIFICATIONS

| | |
|---|---|
| SIZE: | 240 mm – 245 mm – 140 mm |
| CLASS OF PROTECTION: | IP65 PROTECTING THE BNC OF THE PH electrode |
| CROSS-SECTION OF TERMINALS: | $4mm^2$ , or diameter 2.4 mm |
| POWER SUPPLY REQUIREMENTS: | standard 230V ± 10% 50-60 Hz, on request 115V |
| ABSORPTION: | 15W |
| MAX. CAPACITY ON RELAYS: | 3A 250VAC (with resistive load) |
| WORKING TEMPERATURE | 0 to 50 ° C |
| 1.1 STORAGE TEMPERATURE | -10 to 70 °C |
| SCALE OF MEASUREMENT OF THE pH: | 0…14.00 pH |
| INPUT IMPEDANCE: | > $10^{13}$ ohm |
| TEMPERATURE OFFSETTING: | MANUAL/AUTOMATIC 0 to 125 °C |
| CONTROL OVER SET POINT: | ON/OFF<br>BREAK/WORK<br>CURRENT, PROPORTIONAL |
| Remote repetition of the measurement: | 0/4 to 20 mA galvanically separated<br>Can be fully configured for re-transmission of measurement or control<br>Resolution 255 points<br>Maximum load 1 K Ohm |
| SCALE OF MEASUREMENT OF Cl: | 0 to 5.00 ppm or mg/l |
| TEMPERATURE OFFSETTING: | Excludable<br>MANUAL/AUTOMATIC 0 to 125 °C |
| PH OFFSETTING: | Excludable<br>Range of compensation 6 to 8.35 pH |
| CONTROL OVER SET POINT: | ON/OFF<br>BREAK/WORK<br>CURRENT, PROPORTIONAL |
| RE-TRANSMITTED OUTPUT : | 0/4 to 20 mA galvanically separated<br>Can be fully configured for re-transmission of measurement or control<br>Resolution 255 points<br>Maximum load 1 K Ohm |

N.B. In swimming-pool water treated with DICHLOR or TRICHLOR-isocyanate it is important to provide a good change of the water so that the residual isocyanate acid will not exceed 50 ppm in order to ensure correct chlorine measurement.

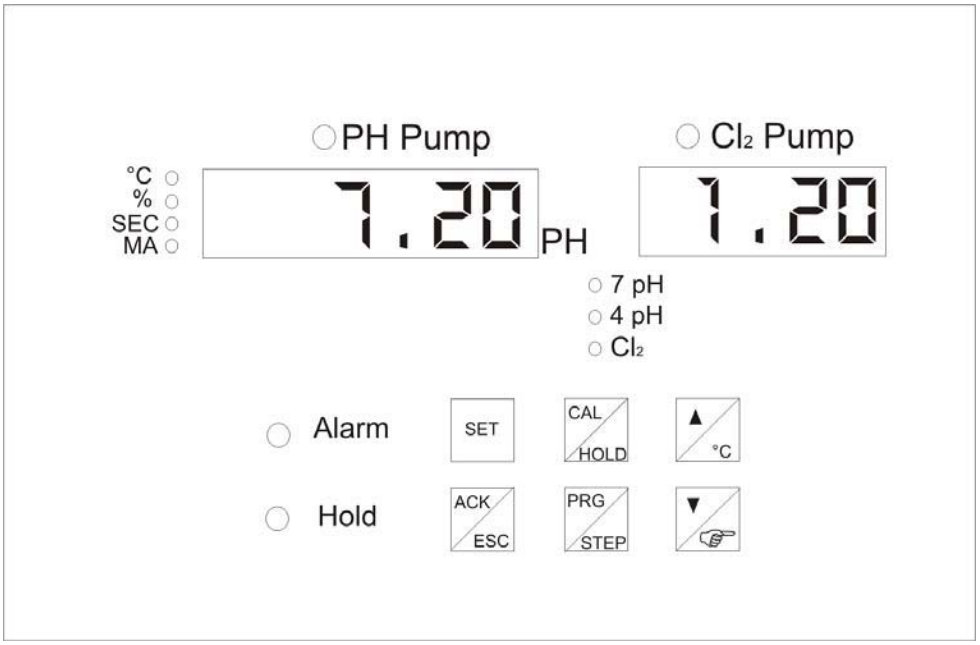
## 2___CONNECTIONS TO THE TERMINAL STRIP:




| Terminal Nr | Description |
|---|---|
| 1 | NEUTRAL |
| 2 | PHASE |
| | |
| 3 – 4 | RELAY S.V. (SOLENOID VALVE) |
| 5 – 6 | RELAY PH PUMP |
| 7 – 8 | RELAY CHLORINE PUMP |
| 9 – 10 | RELAY ALARM |
| 11 – 12 | NOT USED |
| 13 | COPPER ELECTRODE |
| 14 | PLATINUN ELECTRODE |
| 15 | PT100 INPUT |
| 16 | PT100 INPUT |
| 17 | PT100 INPUT |
| 18 – 19 | FLUS SIGNAL INPUT |
| 19 – 20 | KEY SIGNAL INPUT |
| 21 | PROP. CORRENT. OUTPUT CL NEGATIVE POLE |
| 22 | PROP. CORRENT. OUTPUT CL POSITIVE POLE |
| 23 | PROP. CORRENT. OUTPUT PH NEGATIVE POLE |
| 24 | PROP. CORRENT. OUTPUT PH POSITIVE POLE |
| 25 | PROP. FREQU. OUTPUT CL NEGATIVE POLE |
| 26 | PROP. FREQU. OUTPUT CL POSITIVE POLE |
| 27 | PROP. FREQU. OUTPUT PH NEGATIVE POLE |
| 28 | PROP. FREQU. OUTPUT PH POSITIVE POLE |

**NOTE:**
IF A BRIDGE IS CREATED BETWEEN TERMINALS 15 AND 17 ,THE INSTRUMENT WILL RECOGNISE THAT THE PT100 IS DISCONNECTED AND GOES INTO MANUAL CONTROL.

# 3___CONTROL PANEL




## GENERAL DESCRIPTION OF THE KEYPAD

| | |
|---|---|
| SET | This key displays the set points that have been set. If this function is enabled, it can be used to change the value. Pressed together with the MAN, it can be used to force the status of the setting relays. |
| PRG STEP | It this key is pressed, the indication PrOG will appear. If it is kept pressed for 5 seconds, the programming mode will be entered. If this key is inhibited by the protection provided on the terminal strip, when it is pressed the indication dIS will appear.<br>If the programming mode has been entered, programming will move ahead by one step each time this key is pressed. |
| ACK ESC | This key takes programming back step by step. If it is kept pressed for 5 seconds, the programming function is exited, saving all the data in the permanent storage.<br>This switches off the alarm relay, however if the alarm status persists, the appropriate LED will stop flashing and remain steady on until the cause of the alarm is eliminated. It resets an error message and reinstate the incorrect datum by default. |
| ▲ | This key increments the value being displayed during the programming procedure. It increments the value displayed by pressing the SET key.<br>It displays the reference temperature ( manual or automatic). If the temperature is manual, it should be pressed at the same time as the DOWN key. |
| ▼ | This key can be used to change the temperature value. It decrements the value that is displayed during the programming mode. It decrements the value that is displayed by pressing the SET key.<br>It enables the manual function, and if it is pressed together with the SET key, it can be used to force the relays controlling the pumps in the manual mode. |
| CAL HOLD | This key can be used to enter the Calibration Menu. |

## GENERAL DESCRIPTION OF THE SIGNALLING LAMPS

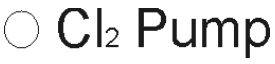
**PH measurement display**

**Chlorine measurement display**

**Two-coloured LED. This indicates the status of the pH pump**

| | |
|---|---|
| **OFF** | The pH pump is switched off. |
| **GREEN** | The set point is active however the pump is temporarily switched off |
| **RED** | The set point is active and the pump is switched on. |
| **FLASHING RED** | During programming, it indicates that the parameter being displayed refers to control of the pH set point. |

**Two-coloured LED. This indicates the status of the chlorine pump**




| | |
|---|---|
| **OFF** | The chlorine pump is switched off. |
| **GREEN** | The set point is active however the pump is temporarily switched off |
| **RED** | **The set point is active and the pump is on.** |
| **FLASHING RED** | In the programming phase, this indicates that the parameter being displayed refers to control of the Chlorine set-point. |

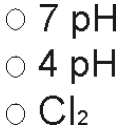
**Red LED. This indicates an alarm status.**

| | |
|---|---|
| **FLASHING RED** | An alarm status has occurred and the alarm relay is active. To reset the alarm press the ACK key. |
| **RED** | An alarm has been acknowledged by pressing the ACK key, however the cause leading to the alarm is still present. The alarm LED will extinguish once the cause of the alarm has been eliminated. |

**Red LED. This indicates a status of total stoppage of the functions of the instrument.**

**RED** When it is illuminated, it signals a temporary block of operation of the pumps. The current outputs remain locked on the last value that was re-transmitted.

**CALIBRATION FUNCTIONS**




| | |
|---|---|
| **7 pH** | The instrument prompts you to dip the electrode into a standard solution having a pH of 7. It is therefore ready to carry out calibration of the offset on the pH electrode |
| **4 pH** | The instrument prompts you to dip the electrode into a standard solution having a pH of 4. It is therefore ready to carry out calibration of the gain on the pH electrode |
| **$Cl_2$** | The instrument is ready to carry out self-calibration of the chlorine measurement. It is waiting for the chlorine value measured by means of the DPD method to be entered. |

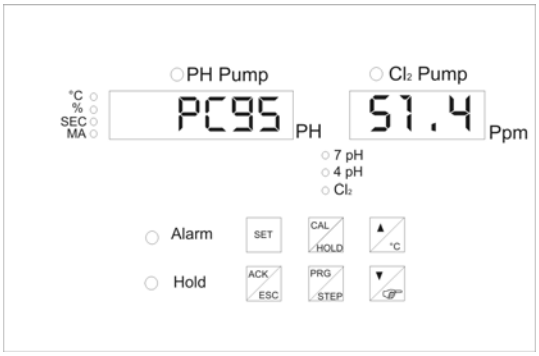
**UNITS OF MEASUREMENT**

°C ○
% ○
SEC ○
MA ○

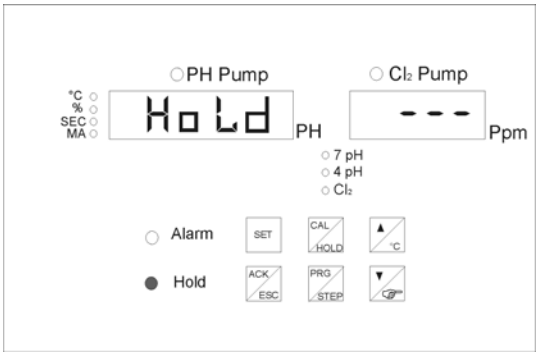
| | |
|---|---|
| **°C** | The numerical value being displayed is a temperature expressed in °C<br>If this indicator is illuminated at the same time as the % sign, this means that the numerical value being displayed is a correction factor in relation to the temperature expressed in %/°C. |
| **%** | The numerical value being displayed is a percentage value |
| **SEC**. | The numerical value being displayed is a unit of time expressed in seconds |
| **mA** | The numerical value being displayed is an output current value expressed in mA or it is a programming parameter that acts on a current output. |

# 4___SWITCHING ON AND PRELIMINARY SETTINGS

When the instrument is switched on, the message **PC95 S 14** will be displayed, indicating its name and the revision number of the software that has been loaded.

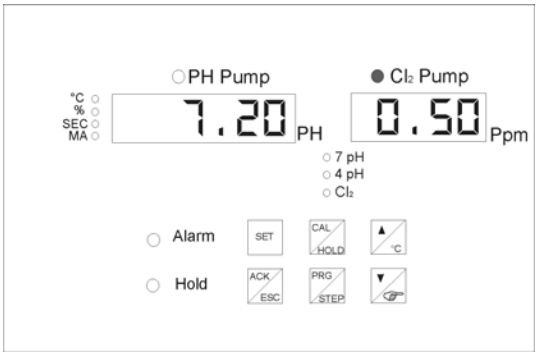



The instrument displays the message **HOLD ---** After a waiting time of about 10 seconds, during which the instrument carries out a software test, the pH and chlorine measurements will be displayed. Clearly, these values are not accurate, since no calibration of the probes has been carried out.




**Warning!!!**
Switch off the pumps before powering up the instrument, since the measurement error described above could cause incorrect metering.

Open the flow of water through the panel and use the flow-meter to set a flow rate of **60 Litres/hour** to ensure proper rotation of the balls contained in the chlorine probe.

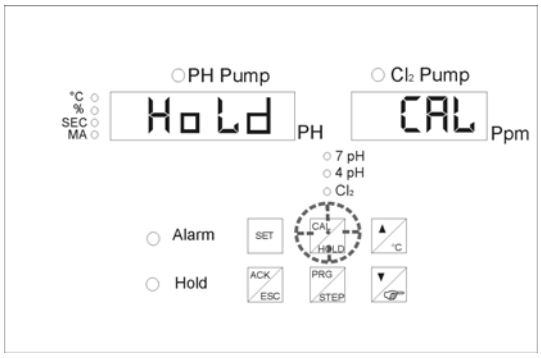



Set the pH value at 7.00 and the chlorine value at 1.00 ppm (approximately) manually, and allow water to circulate through the panel for about 4 hours to enable the pH and chlorine probes to adapt.

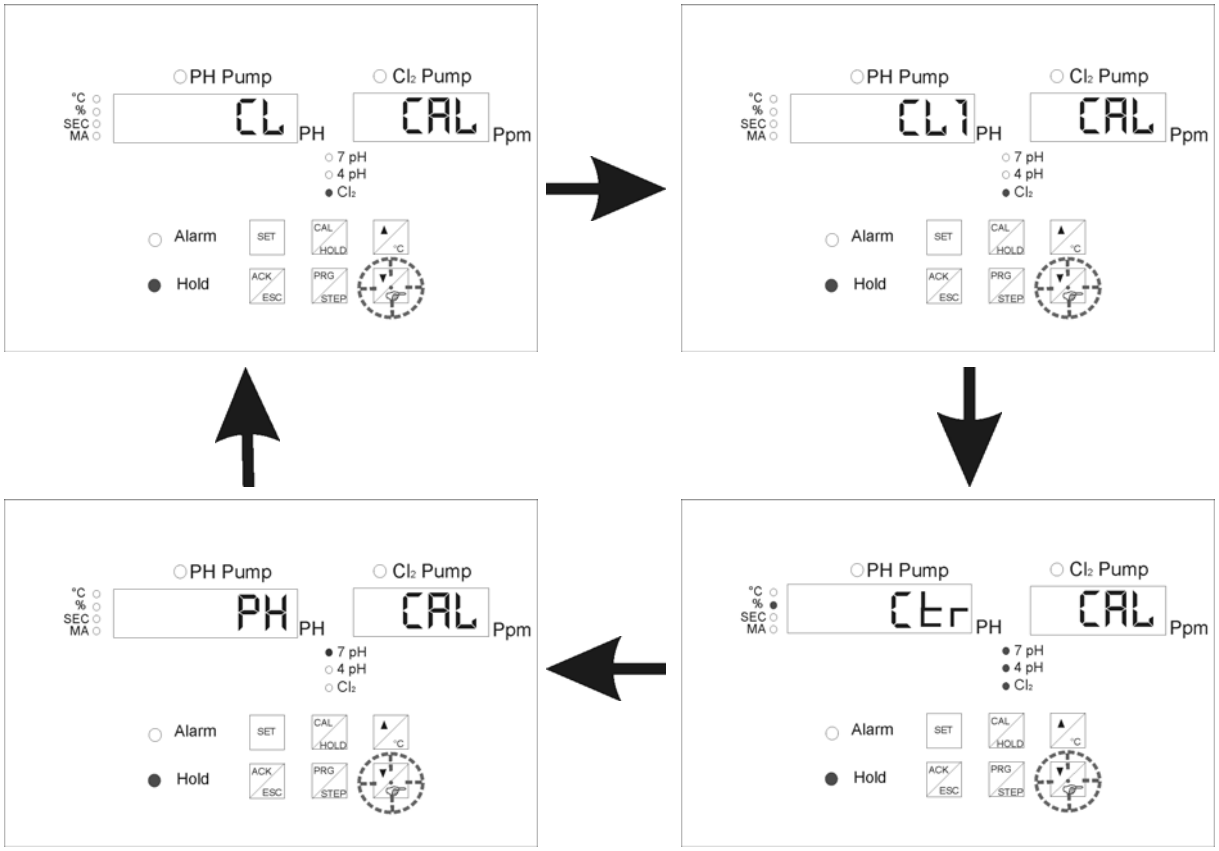
In the explanations of the menus and of the functions of the instrument provided below, the symbol will be used to indicate the keys to be pressed.

## 5___ CALIBRATION

To enter the calibration menu, press the CAL/HOLD key and hold it down for **5 seconds**. The message **Hold Cal** will appear and after the time has elapsed the message **CL CAL** will appear, and the **Hold** LED will light up.




Pressing the ▼ key will cause the items **CL1, CTR, PH, CL** to appear cyclically.



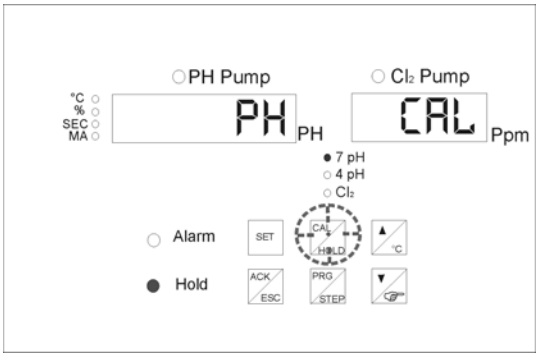
## 5.1___CALIBRATION OF THE pH PROBE

The pH electrode has to be re-calibrated periodically until it is too exhausted, and needs to be replaced.
Calibration of the of the electrode is controlled semi-automatically by the PC95 instrument, which recognises the standard value of the sample solution into which the electrode is dipped on its own, and displays a quality parameter that indicates its degree of exhaustion.

Material required for the calibration:

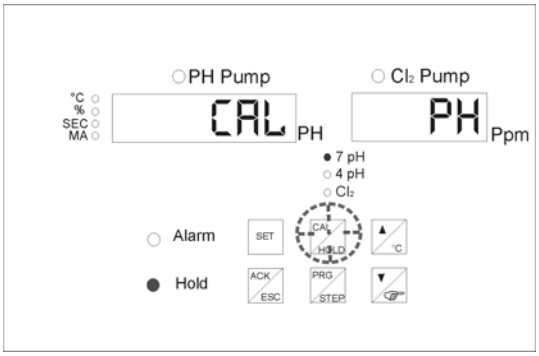
1) **Buffer solution with a pH of 7, properly preserved (BOTTLE N° 1)**
2) **Buffer solution with a pH of 4 or 9.22, properly preserved (BOTTLE N° 3)**
3) **Clean water for washing the electrode (BOTTLE N° 2)**

**NOTES:**
A solution with a **pH of 4** should always be preferred to a solution with a **pH or 9 or 10**, since this pH value is far more stable in time and is not influenced by the temperature.
During the calibration phase, do not dip the electrode into the buffer solutions without washing it thoroughly beforehand. **Do not dry the electrode by rubbing it with paper or rags.** Instead, allow it to drip dry naturally.
Always store buffer solutions in a dark and cool place. Avoid using a solution for longer than one year.

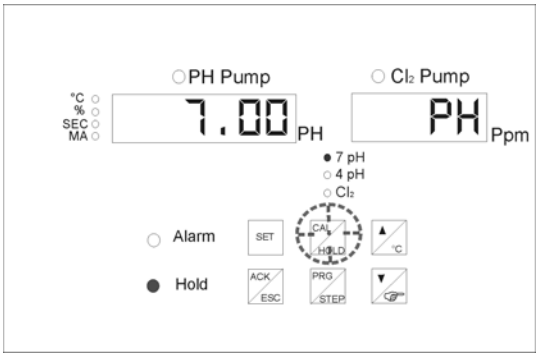



**PROCEDURE**

1. Enter the calibration menu (**See Page 8**) and go to the **PH CAL** function.



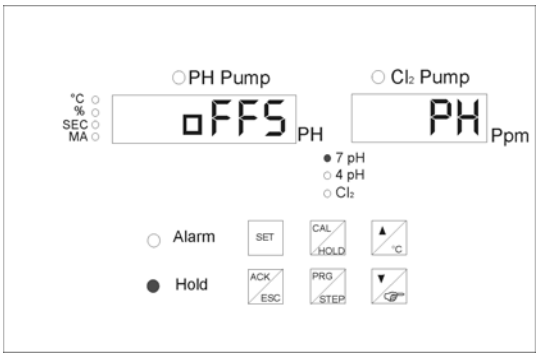

2. To proceed with calibration of the pH probe, press the CAL/HOLD key to confirm.
.




3. At this point the indication **CAL** will appear, the **PH**
Indication will start to flash and the **7 pH LED** will flash.

4. Remove the pH electrode from the tank.

5. Wash the electrode in **bottle n° 2** containing **clean water**.




6. Dip the electrode into **bottle n° 1** containing the solution
with a **pH of 7** for **15 seconds**.

7. Press the CAL/HOLD key.

8. The number **7.00** will appear on the display if the buffer

solution is recognised.
(If an error occurs, replace the buffer solution)

9. Press the CAL/HOLD key. The value of the buffer solution that has been recognised is shown on the display.

10. Press the CAL/HOLD key. The indication **OFFS PH** will appear on the display. Wait for **30 seconds** for calibration of the probe.
The instrument will calculate the **OFFSET** value and show the quality of the electrode as a percentage value.

11. After **5 seconds** the indication **CAL PH** will appear on the display and the **4 pH LED** will flash.

12. Wash the electrode in **bottle n° 2** containing clean water.

13. Dip the electrode into **bottle n° 3** containing the solution with a **pH of 4** leaving it there for **15 seconds**.

14. Press the CAL/HOLD key

15. The value of the buffer solution that has been recognised will appear on the display.
(If an error occurs, replace the buffer solution)

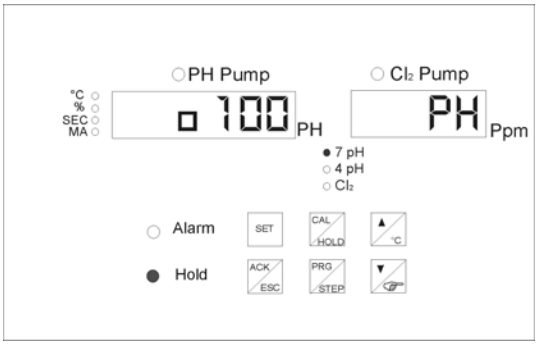
16. If you are using a different buffer solution, correct the value using the ▲/°C and ▼ keys,

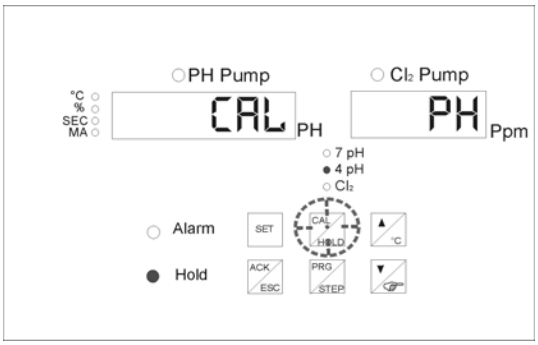
17. Press the CAL/HOLD key. The indication **GAIN PH** will appear on the display. Wait for **30 seconds.**
The instrument will calculate the **GAIN** value and show the quality of the electrode as a percentage value.

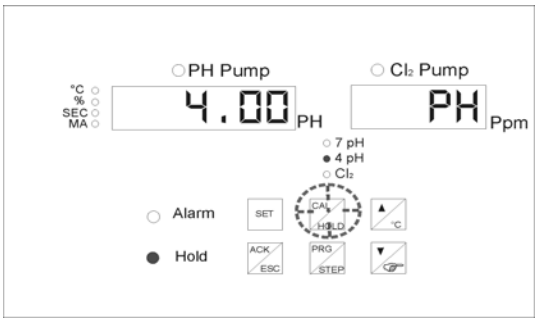
18. The instrument will save the parameters calculated and the indication **SAVE PAR** will appear on the display

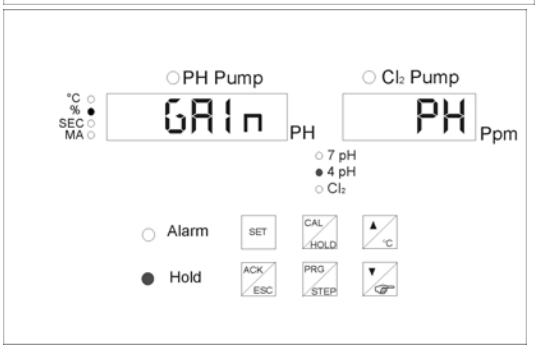
for one second. The instrument will then exit the calibration menu and return to the measurement mode.
The **HOLD** mode will remain active.

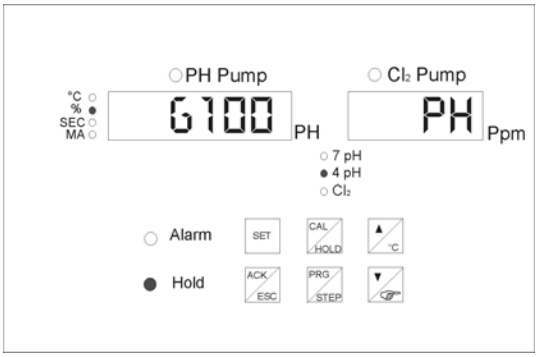
19. Place the electrode back into the tank, open the flow of water again setting it at **60 litres/hour** and press the ACK/ESC key to exit the **HOLD** mode.

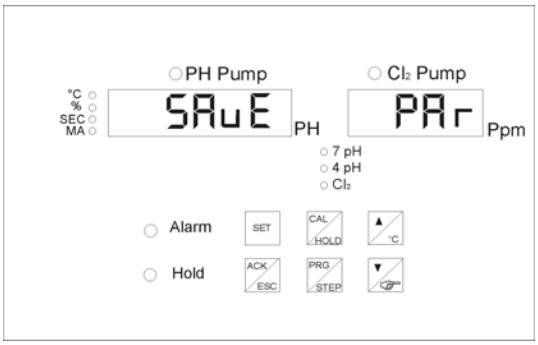


## 5.2___ CALIBRATION OF THE CHLORINE PROBE

### 5.2.1___ INITIAL CALIBRATION

**<u>This calibration procedure has to be carried out each time 20% or more of the water contained in the swimming pool is replaced.</u>**

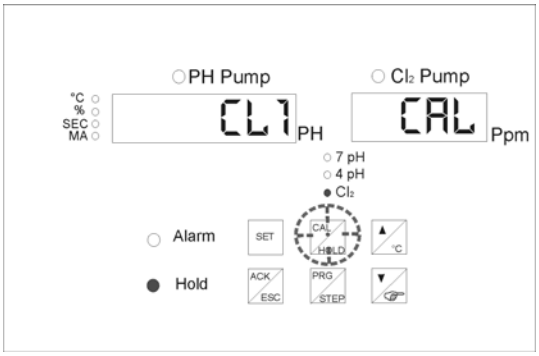
If the measuring cell is new, empty out the water contained in it and clean the copper electrode thoroughly using the brush provided for this purpose **(page 29)**. Buff the surface coming into contact with the water until it is shiny. ALLOW CHLORINATED WATER TO CIRCULATE FOR 4 HOURS.

**N.B.** <u>A FIRST CALIBRATION HAS TO BE CARRIED OUT AFTER THE CELL HAS BEEN WORKING WITH CHLORINATED WATER HAVING A CONTENT COMPRISED BETWEEN **0,7 PPM** AND **1.4 PPM** FOR AT LEAST **4 HOURS.**</u>

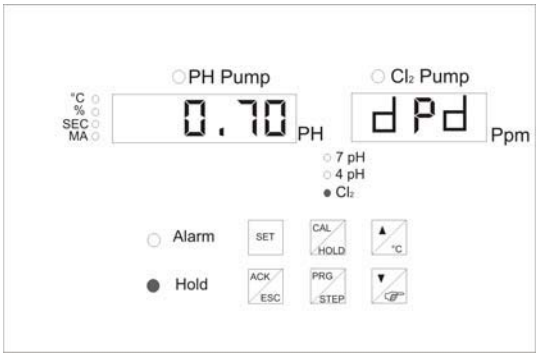
**PROCEDURE**

1. Take a sample of chlorinated water from the tap provided for this purpose and determine its residual free chlorine value by means of a **DPD method.**

2. Enter the calibration menu (**<u>See Page 8</u>**) and go to the **CL1 CAL** function.

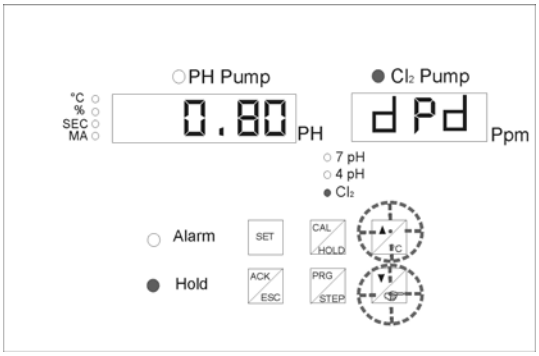



The indication **CL1** will appear on the display together with **CAL**. The **CL2 LED** will flash.

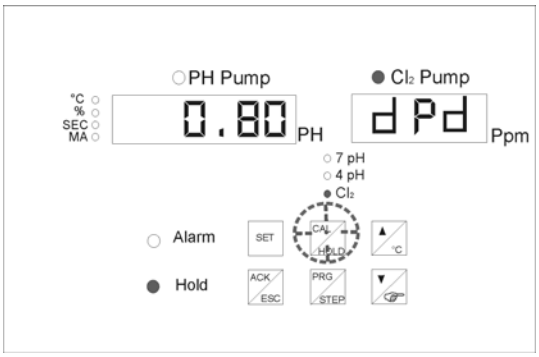



Press the CAL/HOLD key

The chlorine value shown at that moment in time will appear on the display together with the indication **DPD.**




Use the ▲ °C and ▼ keys to set the chlorine value measured by means of the DPD method (e.g. 0.80 ppm).

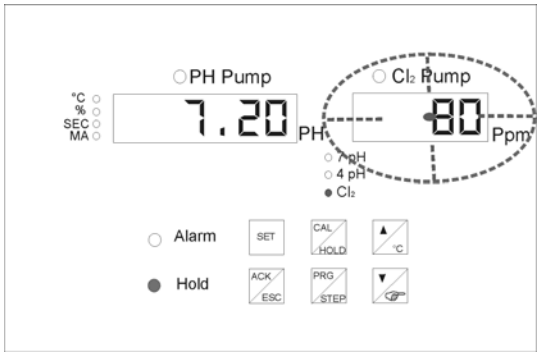



Press the CAL/HOLD key
The solenoid valve will be powered up and stop the flow of water.

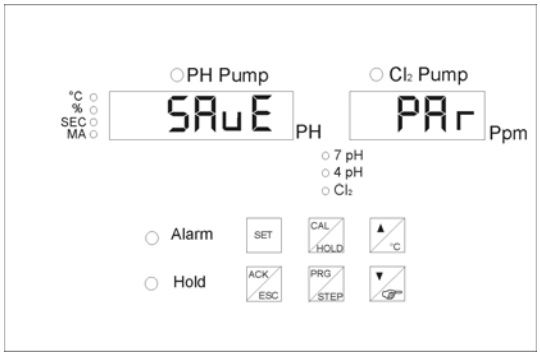
The instrument starts the automatic calibration procedure
with **a number of measurements that is proportional to the concentration found:**

Example: 0.80 ppm = 80 measurements
1.10 ppm = 110 measurements

The progressively decreasing number of measurements being carried out on the water contained in the probe will appear on the chlorine display.
The solenoid valve will remained powered up throughout the calibration time.
The **HOLD** and **$Cl_2$ LEDs** will remain illuminated throughout the whole procedure.




The instrument will save the parameters calculated and the indication **SAVE PAR** will appear on the display for one second.
The instrument will then exit the calibration menu, power down the solenoid valve and reinstate the flow of water.



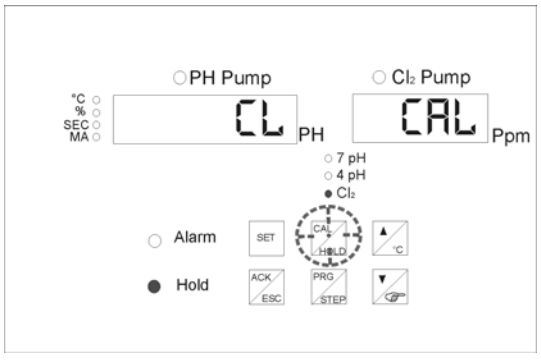

The operator does not need to control the panel since calibration is fully automated. The time required for calibration is about **15 minutes for 1 ppm** of chlorine.

**ONCE THE FIRST CALIBRATION HAS BEEN COMPLETED AND THE CORRECT CHLORINE CONCENTRATION VALUE HAS BEEN FOUND, IT IS NOT NECESSARY TO CARRY OUT PERIODIC CALIBRATION.**

**NOTES:**
If the indication **LOW** flashes on the display, this means that the instrument has found the chlorine value present at the time of calibration insufficient for carrying out accurate calibration. It is in any case possible to proceed, but accepting a certain margin of error ( <= 10% ).

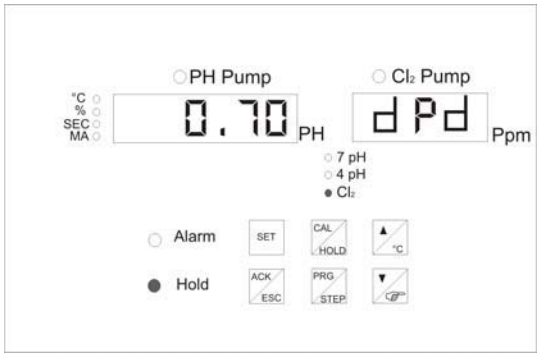
## 5.2.2___PERIODIC CALIBRATION

This function can be used to improve the measurements carried out by the instrument.
Take a sample of chlorinated water from the tap provided for this purpose and determine the residual free chlorine content using a **DPD** method.



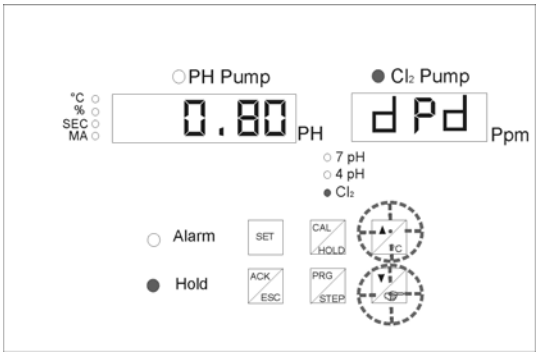

Enter the calibration menu (**See Page 8**) and go to the **CL CAL** function.

The indication **CL** will appear on the display together with **CAL** and the **CL2 LED** will flash.

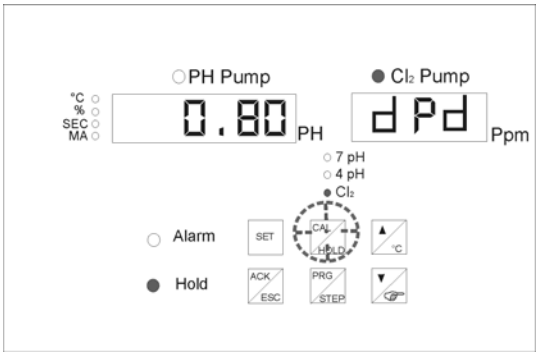



Press the CAL/HOLD key.

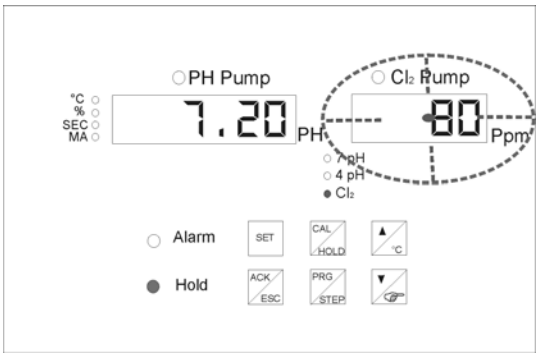
The chlorine value shown at that moment in time will appear on the display together with the indication **DPD.**




Use the ▲ °C and ▼ keys to set the chlorine value measured by means of the DPD method (e.g. 0.80 ppm).

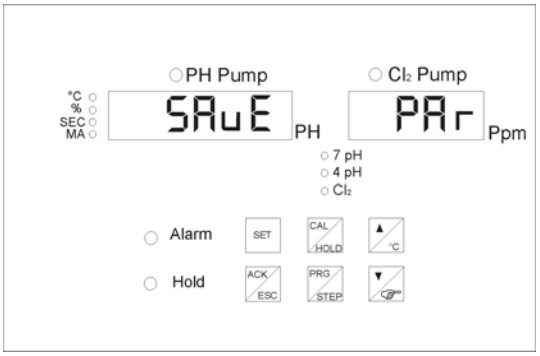



Press the CAL HOLD key.
The solenoid valve will be powered up and shut off the flow of water.




The instrument will start the automatic calibration procedure
with **80 measurements** on the water contained in the probe. The procedure will be shown on the display.
The solenoid valve will remain powered up throughout the calibration time.
The **HOLD** and the **$Cl_2$ LEDs** will remain illuminated throughout the whole procedure.

The instrument will save the parameters calculated and the indication **SAVE PAR** will appear on the display for one
second. The instrument will then exit the calibration menu, the solenoid valve will be powered down and the flow of water will be reinstated.




The number of measurements carried out by the instrument will be proportional to the concentration.

**Example:** 0.80 ppm = 80 measurements 1,10 ppm = 110 measurements

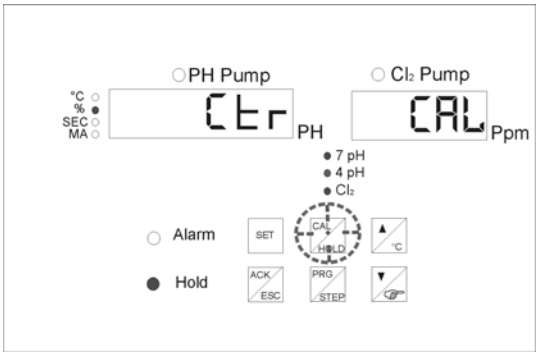
The operator does not need to control the panel since calibration is fully automated. The time required for calibration is about **15 minutes for 1 ppm** of chlorine.

If the indication **LOW** flashes on the display, this means that the instrument has found the chlorine value present at the time of calibration insufficient for carrying out accurate calibration. It is in any case possible to proceed, but accepting a certain margin of error ( <= 10% ).

### 5.3___PROBE CHECK

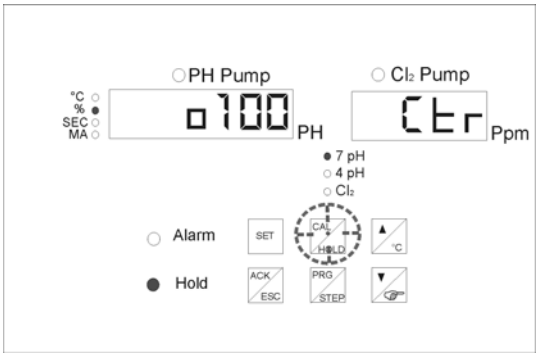
Once the calibration procedures have been completed it will be possible to read the values again as percentage values of the quality of the probes that have been calibrates.

Enter the calibration menu (**See Page 8**) and go to the **Ctr CAL** function.



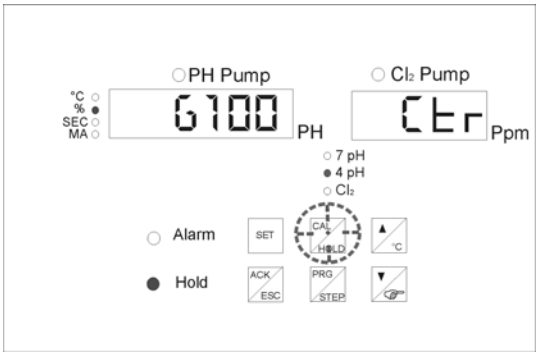

The indication **Ctr CAL** will appear on the display and the **7pH, 4pH, CL2 LEDs** will flash.

Press the CAL/HOLD key.



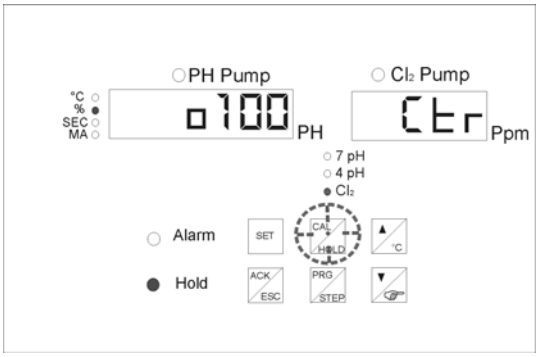

The indication **o100 Ctr** will appear on the display together with the **7 pH LED** and the **%** symbol will light up to indicate the OFFSET quality of the pH electrode.

Press the CAL/HOLD key .



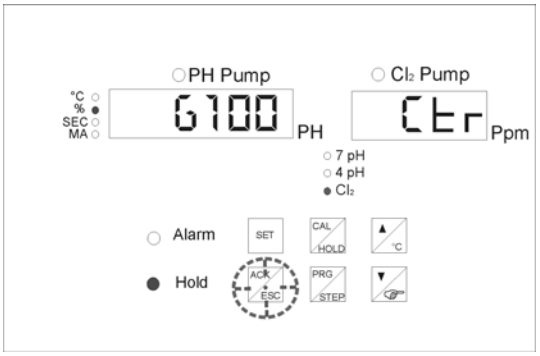

The indication **G100 Ctr** will appear on the display with the **4 pH** and **% LEDs** illuminated. The instrument will indicate the GAIN quality of the pH electrode.

Press the CAL/HOLD key




The indication **o100 Ctr** will appear on the display with the **Cl₂** and **% LEDs** illuminated. The instrument will indicate the OFFSET quality of the chlorine electrode.

Press the CAL/HOLD key



The indication **G100 Ctr** will appear on the display with the **$Cl_2$** and **% LEDs** illuminated. The instrument will indicate the GAIN quality of the chlorine electrode.

To exit the menu press the

key.

The indications referred to the quality of the electrode have to be considered separately. A low quality level for one of the two parameters is an indicator of poor quality, even if the other indicates a good level.

**WARNING:** Always check the quality of the standard solutions, which must be uniformly coloured. Take care not to use buffer solutions that have been open for more than one year.

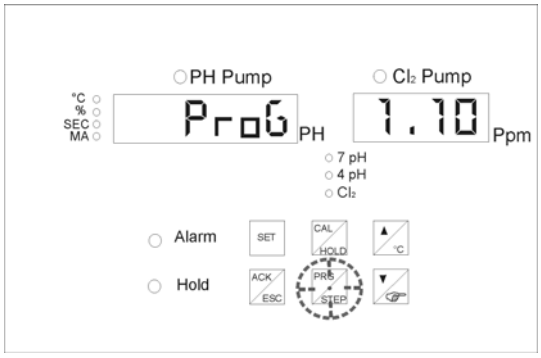
**EXAMPLE:**
Let us assume that on carrying out calibration with a pH of 7 the quality is found to be 10%, while with a pH of 4 it is found to be 98%.

In this case it is clear that the reference element of the electrode has deteriorated earlier than expected. This is typical, for example, of chlorination systems in which SHOCK chlorination is carried out, as this tends to pollute the reference of the electrode.

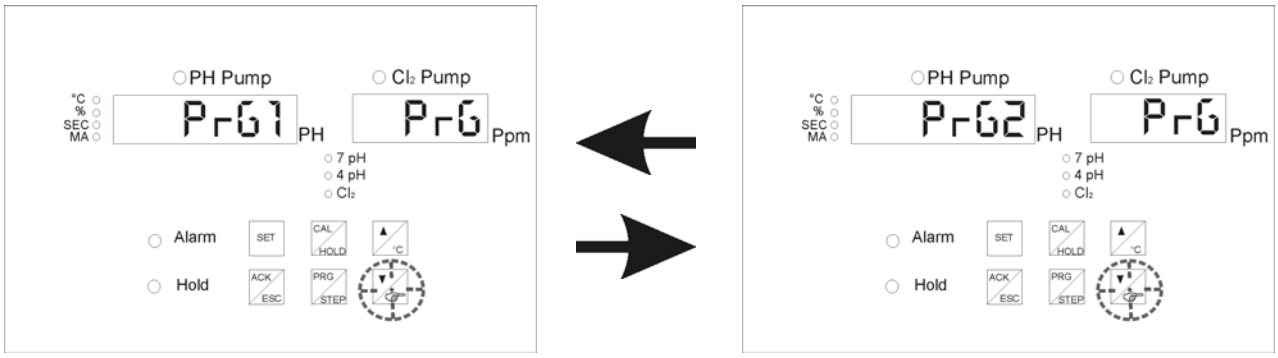
In these cases, it is a good rule to close the measuring system during the super-chlorination procedure, or to use special electrodes with a double barrier, designed specifically to avoid damage caused by the chlorine dissolved in the water.

# 6___PROGRAMMING MENU

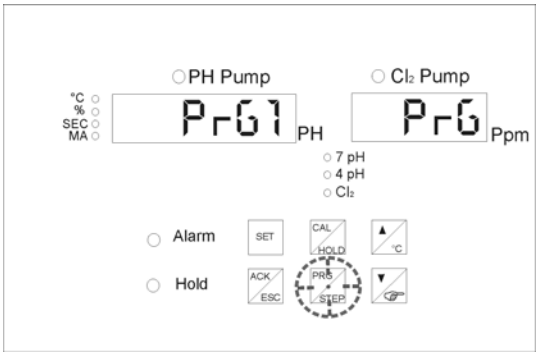
To access the programming menu keep the PRG/STEP key pressed for **5 seconds.** The indication PROG will appear on the display.



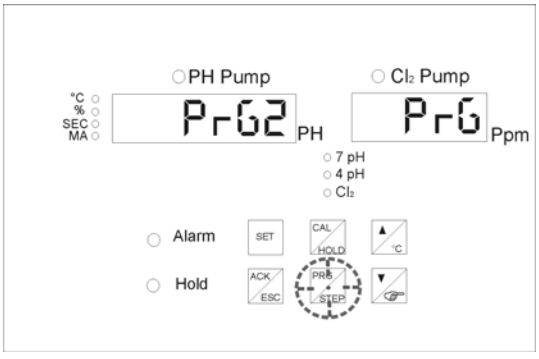

After entering the programming function and with the first item **PRG1** on the display, it is possible to use the ▼ Key to alternate between the two items **PRG1** and **PRG2**.




By pressing the PRG/STEP key with the item **PRG1** shown on the display, the short menu consisting of the essential variables will be accessed.




By pressing the PRG/STEP key with the item **PRG2** shown on the display, the complete menu containing all the variables will be accessed.



## 6.1___LIST OF VARIABLES

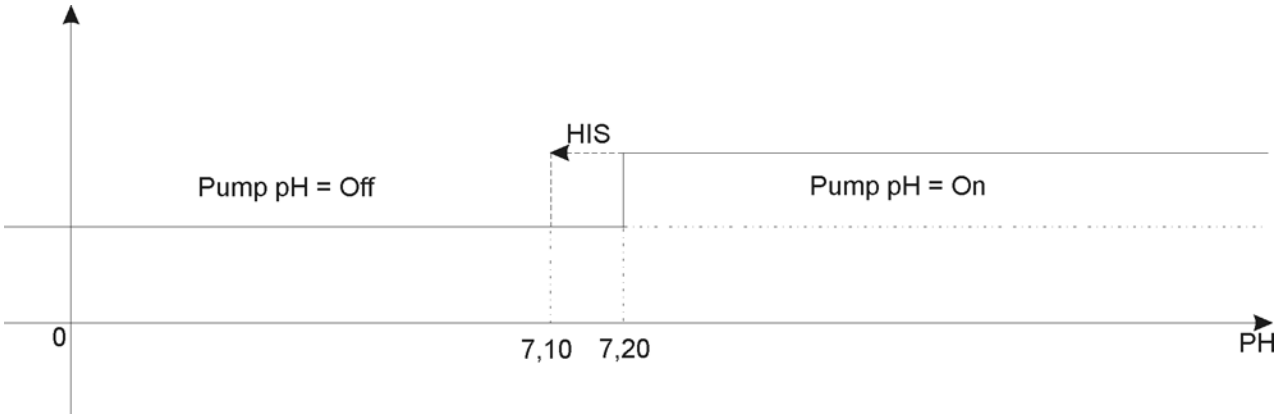
### 6.1.1___ PRG1 menu

Enter the programming menu (**See Page 16**) and go to the **PRG1** function.
The variables viewed are the following:

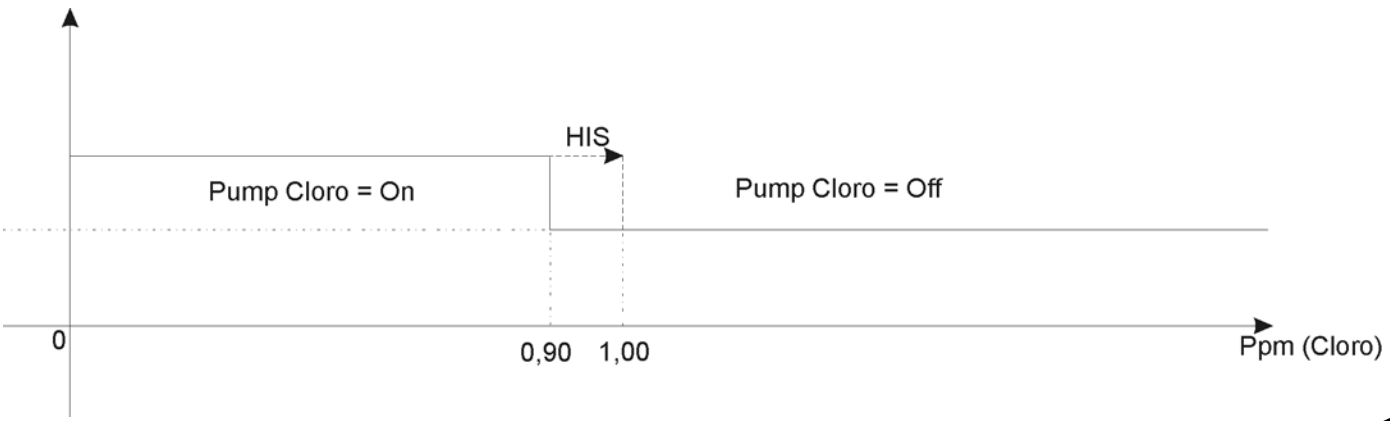
| VARIABLES | PERMISSIBLE LIMITS | DEFAULT VALUES | COMMENTS |
|---|---|---|---|
| | | | |
| **PH SETTINGS** | | | |
| SET | 0 to 14,00 | pH 7.20 | SET POINT pH |
| ALL | 0 to SET | pH 6.50 | pH minimum alarm |
| ALH | SET to 14.00 | pH 7.90 | pH maximum alarm |
| REL | ACID/ALKALINE | ACID | Type of control |
| HIS | 0,00…1,40 | 0,00 pH | PH hysteresis |
| | | | |
| **CHLORINE SETTINGS** | | | |
| SET | 0…5,00 | 0.60 ppm | Chlorine SET POINT |
| ALL | 0…SET | 0.30 ppm | Chlorine minimum alarm |
| ALH | SET…5,00 | 1.50 ppm | Chlorine maximum alarm |
| REL | LO | LO | Type of control |
| HIS | 0,00…0,50 | 0.00 ppm | Chlorine hysteresis |
| CPH | ON / OFF | OFF | Enabling of correction of chlorine measurement in relation to pH. |
| **ENABLING** | | | |
| EN | S-/-C/SC/-- | SC | Enables the Cal and Set keys |

By setting these variables it is possible to achieve ON / OFF control of the metering pumps.
**Example:**
The graphs illustrate adjustment of the measurement Set Point with a hysteresis value other than nought.

SET POINT pH = 7,20 pH (SET)
Hysteresis = 0,10 pH (HIS)




SET POINT CL = 0.90 ppm (SET)
Hysteresis = 0.10 ppm (HIS)



### 6.1.2___ PRG2 menu

Enter the programming menu (**See Page 16**) and go to the **PRG2** function.
The variables displayed are the following:

| VARIABLES | PERMISSIBLE LIMITS | DEFAULT VALUES | COMMENTS |
|---|---|---|---|
| | | | |
| **PH SETTINGS** | | | |
| SET | 0 to 14.00 | 7.20 pH | SET POINT pH |
| ALL | 0 to SET | 6.50 pH | pH minimum alarm |
| ALH | SET to 14.00 | 7.90 pH | pH maximum alarm |
| REL | ACID/ALCA | ACID | Type of control |
| PRS | NO / NC | NO | Status of the pH relay |
| DEL | 0 to 255 | 0 Seconds | Delay time, pH metering |
| SPM | 20 to 150 | 20 strokes/min | Strokes/minute, Output Freq. |
| BP | 0.50 to 2.80 | 0,50 pH | Proportional band |
| REG | ONOF/PULS/PROP | ONOF | Control mode |
| OUT | MIS/REG | MIS | Working mode Output mA |
| HIS | 0.02 to 1.40 | 0.00 pH | Hysteresis |
| RMA | 0-20/ 4-20 | 4-20 mA | MA output dynamics |
| MMA | 0.1 to 5.00 | 0.1 mA | Offset Output mA |
| PHS | 0 to 10.00 | 0 pH | Initial value for reg. mA |
| PHE | PHS to 14.00 | 14.00 pH | End value for per reg. mA |
| Ton | 0 to 999 seconds | 0 Seconds | ON time (pulsed control) |
| Tof | 0 to 999 seconds | 0 Seconds | OFF time (pulsed control) |
| BND | 0.00 to 2.00 pH | 0.00 pH | Safety range |
| PER | 0 to 999 seconds | 500 Seconds | Period (pulsed control) |
| MON | 0 to 255 seconds | 0 Seconds | Minimum ON time |
| DB | 0 to 10% BP | 0 % of BP | dead band (reversed hysteresis) |
| | | | |
| **CHLORINE SETTINGS** | | | |
| SET | 0 to 5.00 | 0,60 ppm | Chlorine SET POINT |
| ALL | 0 to SET | 0,30 ppm | Chlorine minimum alarm |
| ALH | SET to 5.00 | 1,50 ppm | Chlorine maximum alarm |
| REL | LO | LO | Type of control |
| PRS | NO / NC | NO | Status of chlorine relay |
| DEL | 0 to 255 | 0 Seconds | Delay time for chlorine metering |
| SPM | 20 to 150 | 20 Strokes/min. | Strokes/minute, Output Freq. |
| BP | 0.50 to 2.80 | 0,50 ppm | Proportional band |
| REG | ONOF/PULS/PROP | ONOF | Control mode |
| OUT | MIS/REG | MIS | Working mode Output mA |
| HIS(*) | 0.02 to 0.50 | 0.00 ppm | Hysteresis |
| RMA | 0-20/4.20 | 4-20 mA | Output dynamics in mA |
| MMA | 0.1 to 5.00 | 0.1 mA | Output dynamics mA |
| CLS | 0 to 4.00 | 0 ppm | Initial value for mA control |
| CLE | PHS to 5.00 | 5.00 ppm | End value for per mA control |
| Ton | 0 to 999 seconds | 0 Seconds | ON time (pulsed control) |
| Tof | 0 to 999 seconds | 0 Seconds | OFF time (pulsed control) |
| BND | 0.00 to 2.00 | 0.00 ppm | Safety band |
| PER | 0 to 999 seconds | 500 seconds | Period (Reg. Prop.) |
| MON | 0 to 255 seconds | 0 seconds | Minimum ON time |
| DB | 0 to 10% BP | 0 % of BP | dead band (reversed hysteresis) |
| CTP | 0 to 10 | 0 %/°C | Coefficient for offsetting the the measured value in relation to the temperature expressed in %/°C. |
| CPH | ON / OFF | OFF | Enabling of correction of the chlorine measurement in relation to the pH. |
| **ENABLING** | | | |
| EN | S-/-C/SC/-- | SC | Enables the Cal and Set keys |
| ID | 1 to 30 | 1 | Indicates the ID of the multi-point .serial network |
| BR | 1200 to 9600 | 2400 | Baud rate of RS485 serial link |

# 7___ CONTRO PROCEDURES

## 7.1___ON / OFF

Enter the programming menu (**See Page 16**) and go to the **PRG2** function.

| VARIABLES | DEFAULT VALUES | COMMENTS | |
|---|---|---|---|
| | | | |
| **PH SETTINGS** | | | |
| | | | |
| | | | |
| SET | 7,20 pH | SET POINT pH | |
| ALL | 6,50 pH | PH minimum alarm | |
| ALH | 7,90 pH | PH maximum alarm | |
| REL | ACID | Type of control | |
| PRS | NO | Status of the pH relay | |
| DEL | 0 Seconds | Delay time, pH metering | |
| SPM | 20 Seconds | Strokes/minute, Output Freq. | |
| BP | 0,50 pH | Proportional band | |
| **REG** | **ONOF** | **Control mode** | |
| **OUT** | **MIS / REG** | Working mode Output mA | |
| HIS | 0,00 pH | Hysteresis | |
| MMA | 0,1 mA | OFFSET OUTPUT IN mA | |
| RMA | 4-20 mA | MA output dynamics | |
| PHS | 0 pH | Initial value for reg. mA | |
| PHE | 14,00 pH | End value for per reg. mA | |
| | | | |
| **CHLORINE SETTINGS** | | | |
| SET | 0.60 ppm | Chlorine SET POINT | |
| ALL | 0.30 ppm | Chlorine minimum alarm | |
| ALH | 1.50 ppm | Chlorine maximum alarm | |
| REL | LO | Type of control | |
| PRS | NO | Status of chlorine relay | |
| DEL | 0 Seconds | Chlorine-metering delay time | |
| SPM | 20 Seconds | Strokes/minute, Output Freq. | |
| BP | 0.50 pH | Proportional band | |
| **REG** | **ONOF** | **Control mode** | |
| **OUT** | **MIS / REG** | MA output working mode | |
| HIS | 0.00 ppm | Hysteresis | |
| MMA | 0.1 mA | OFFSET OUTPUT IN mA | |
| RMA | 4-20 mA | MA output dynamics | |
| CLS | 0 ppm | Initial value for mA control | |
| CLE | 5.00 ppm | End value for per mA control | |
| CTP | 0 %/°C | Coefficient for offsetting the the measured value in relation to the temperature expressed in %/°C. | |
| CPH | OFF | Enabling of correction of the chlorine measurement in relation to the pH. | |
| **ENABLING** | | | |
| EN | SC | Enables the Cal and Set keys | |
| ID | 1 | Indicates the ID of the multi-point .serial network | |
| BR | 2400 | Baud rate of RS485 serial link | |

By selecting the variables **REG = ONOF** and **OUT = MIS** in the menu, it will be possible to have the variables indicated above.
If **OUT = REG** , the variables to be set for the pH and for the CHLORINE will only be those variables that are underscored.

This is the simplest and most elementary type of control that can be implemented. The metering device is switched on as soon as the SET POINT measurement is exceeded, and switched off again as soon as the measurement returns to less than a given value to be set, that is defined as HYSTERESIS.
The HYSTERESIS value makes it possible to avoid constant switching on and off of the metering device. Limited hysteresis improves control, but to the detriment of the metering device, which would be subject to greater wear (graphs on page 19).

### 7.2___PULS

Enter the programming menu (**See Page 16**) and go to the **PRG2** function.

| VARIABLES | DEFAULT VALUES | COMMENTS | |
|---|---|---|---|
| | | | |
| **PH SETTINGS** | | | |
| | | | |
| SET | 7,20 pH | SET POINT pH | |
| ALL | 6,50 pH | PH minimum alarm | |
| ALH | 7,90 pH | PH maximum alarm | |
| REL | ACID | Type of control | |
| PRS | NO | Status of the pH relay | |
| DEL | 0 Seconds | Delay time, pH metering | |
| SPM | 20 Seconds | Strokes/minute, Output Freq. | |
| BP | 0,50 Seconds | Proportional band | |
| **REG** | **PULS** | **Control mode** | |
| OUT | MIS | Working mode Output mA | |
| HIS(*) | 0,00 pH | Hysteresis | |
| Ton | 0 Seconds | ON time (Reg. Puls.) | |
| Tof | 0 Seconds | OFF time (Reg. Puls.) | |
| BND | 0,00 pH | Safety band | |
| RMA | 4-20 mA | MA output dynamics | |
| PHS | 0 pH | Initial value for mA control | |
| PHE | 14,00 pH | End value for per mA control | |
| | | | |
| **CHLORINE SETTINGS** | | | |
| SET | 0,60 ppm | SET POINT Chlorine | |
| ALL | 0,30 ppm | Chlorine minimum alarm | |
| ALH | 1,50 ppm | Chlorine maximum alarm | |
| REL | LO | Type of control | |
| PRS | NO | Status of chlorine relay | |
| DEL | 0 Seconds | Chlorine-metering delay time | |
| SPM | 20 Seconds | Strokes/minute, Output Freq. | |
| BP | 0,50 ppm | Proportional band | |
| **REG** | **PULS** | **Control mode** | |
| OUT | MIS | Working mode Output mA | |
| HIS | 0,00 ppm | Hysteresis | |
| Ton | 0 Seconds | ON time (Reg. Puls.) | |
| Tof | 0 Seconds | OFF time (Reg. Puls.) | |
| BND | 0,00 ppm | Safety band | |
| RMA | 4-20 mA | MA output dynamics | |
| CLS | 0 ppm | Initial value for mA control | |
| CLE | 5,00 ppm | End value for per mA control | |
| CTP | 0 %/°C | Coefficient for offsetting the measured value in relation to the temperature expressed in %/°C. | |
| CPH | OFF | Enables correction of the chlorine measurement in relation to the pH | |
| **ENABLING** | | | |
| EN | SC | Enables the Cal and Set keys | |
| ID | 1 | Indicates the ID of the multi-point serial network | |
| BR | 2400 | Baud rate of RS485 serial link | |

By selecting the variable **REG = PULS** within the menu, it will be possible to have the variables indicated above.
With PULS control, there are three basic variables to be set, which are:

1) **Ton**
2) **Tof**
3) **BND**

These three variables enable the metering to be controlled in the timed mode within two points:
For the pH: between the **Set point** and the **Set Point plus the safety band (BND)**
For the Chlorine: between the **Set point** and the **Set Point less the safety band (BND)**
**Example:**
If we set a **pH set point** = 7,20 pH and a safety band **BND** = pH 0.20, we can control the value with a time **Ton and Tof** between a pH of 7.20 and 7.40.

If we set a **chlorine set point** = 1.00 ppm of chlorine and a safety band **BND** = 0.30, we can control the value with a time **Ton and Tof** between 0.70 ppm and 1.00 ppm.

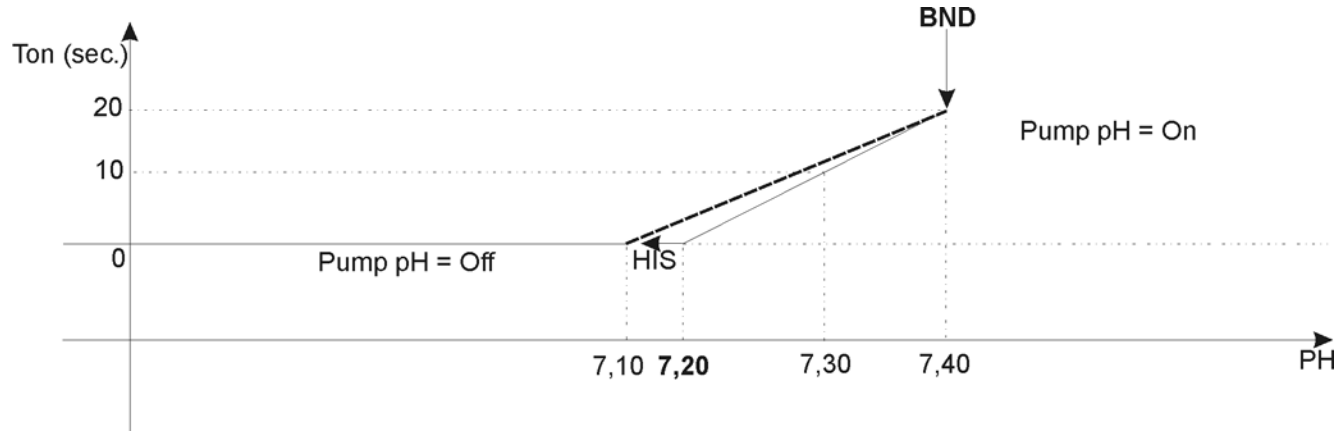
The settings permitted within this range are two:

**1) Ton and Tof having different values**
Example: Ton = 10 seconds Tof = 5 seconds
The metering time of the pump will always be ON for 10 seconds and OFF for 5 secons, within the range that is set.

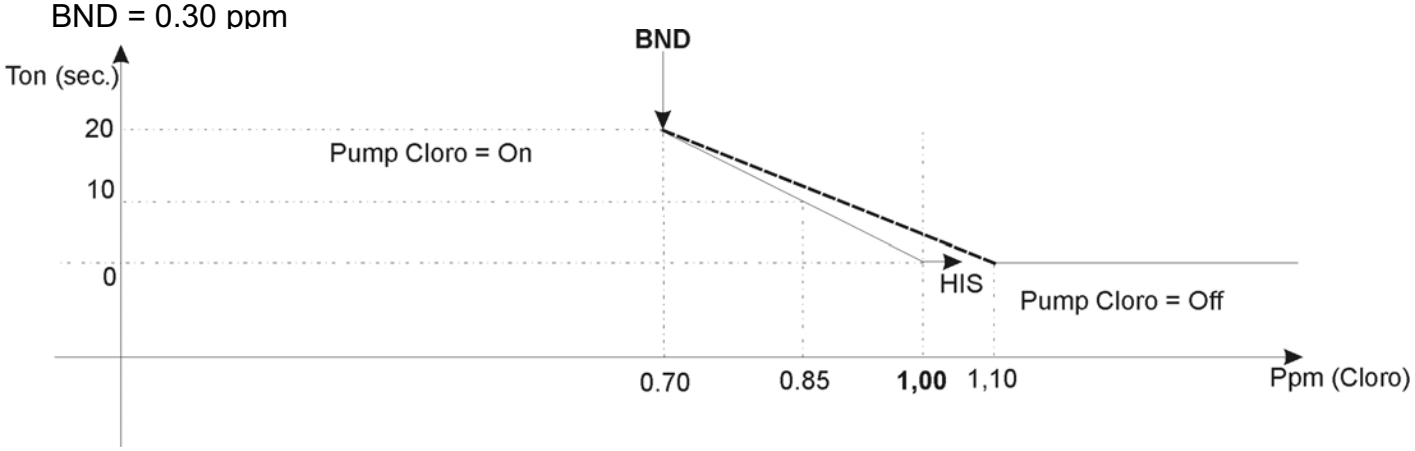
**2) Ton and Tof having the same values**
Example: Ton = 10 seconds Tof = 10 seconds
The metering time of the pump will be **proportional in time** as the Set Point is approached within the range that has been set.

**Proportional example:**
Proportional control, as described above, is illustrated in the following graphs. In addition, a dotted line has been used to show the control that would be achieved if the operator were to set a hysteresis value (HIS).

Set Point = 7,20 pH
**HIS = 0.10 pH (control according to the dotted line)**
Ton = 10 Seconds
Tof = 10 Seconds
BND = 0.20 pH



Set Point = 1.00 ppm
**HIS = 0.10 ppm (control according to the dotted line)**
Ton = 10 Seconds
Tof = 10 Seconds
BND = 0.30 ppm



## 7.3___PROP

Enter the programming menu (**See Page 16**) and go to the **PRG2** function.

| VARIABLES | PERMISSIBLE LIMITS | DEFAULT VALUES | COMMENTS |
|---|---|---|---|
| | | | |
| **PH SETTINGS** | | | |
| SET | 7,20 pH | SET POINT pH | |
| ALL | 6,50 pH | PH minimum alarm | |
| ALH | 7,90 pH | PH maximum alarm | |
| REL | ACID | Type of control | |
| PRS | NO | Status of the pH relay | |
| DEL | 0 Seconds | Delay time, pH metering | |
| SPM | 20 Strokes/min. | Strokes/minute, Output Freq. | |
| BP | 0,50 pH | Proportional band | |
| **REG** | **PROP** | Control mode | |
| OUT | MIS | Working mode Output mA | |
| PER | 500 Seconds | Period (Reg. Prop.) | |
| MON | 0 Seconds | Minimum ON time | |
| DB | 0 % of BP | dead band (reversed hysteresis) | |
| RMA | 4-20 mA | MA output dynamics | |
| PHS | 0 pH | Initial value for mA control | |
| PHE | 14,00 pH | End value for per mA control | |
| | | | |
| **CHLORINE SETTINGS** | | | |
| SET | 0.60 ppm | SET POINT Chlorine | |
| ALL | 0.30 ppm | Chlorine minimum alarm | |
| ALH | 1.50 ppm | Chlorine maximum alarm | |
| REL | LO | Type of control | |
| PRS | NO | Status of chlorine relay | |
| DEL | 0 Seconds | Chlorine-metering delay time | |
| SPM | 20 Strokes/min | Strokes/minute, Output Freq. | |
| BP | 0.50 ppm | Proportional band | |
| **REG** | **PROP** | Control mode | |
| OUT | MIS | Working mode Output mA | |
| PER | 500 Seconds | Period (Reg. Prop.) | |
| MON | 0 Seconds | Minimum ON time | |
| DB | 0 %di BP | dead band (reversed hysteresis) | |
| RMA | 4-20 mA | MA output dynamics | |
| CLS | 0 ppm | Initial value for mA control | |
| CLE | 14.00 ppm | End value for per mA control | |
| CTP | 0 %/°C | Coefficient for offsetting the measured value in relation to the temperature expressed in %/°C. | |
| CPH | OFF | Enables correction of the chlorine measurement in relation to the pH | |
| | | | |
| **ENABLING** | | | |
| EN | SC | Enables the Cal and Set keys | |
| ID | 1 | Indicates the ID of the multi-point serial network | |
| BR | 2400 | Baud rate of RS485 serial link | |

Time-related proportional control enables any changes in the measurement to be followed up rapidly, optimising the metering in relation to the distance from the set point.

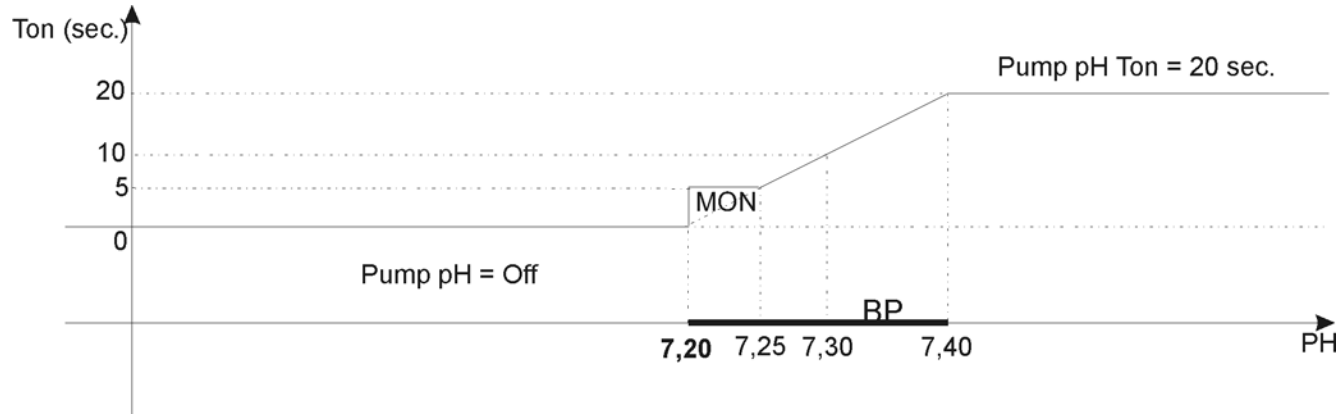
This type of control is recommended in well mixed systems, and enables a good level of control. It is very suitable for controlling both the pH and the chlorine.
One the length of the modulating period of Ton and of Toff has been chosen, it is advisable to keep an eye on the measurements for the first working period, in order to optimise the times.
The minimum Ton value of **MON** enables the SET POINT to be approached with a degree of metering sufficient to exceed it. Otherwise, the pump might always run at the minimum in the vicinity of the set point, without ever stopping.

**Example:**

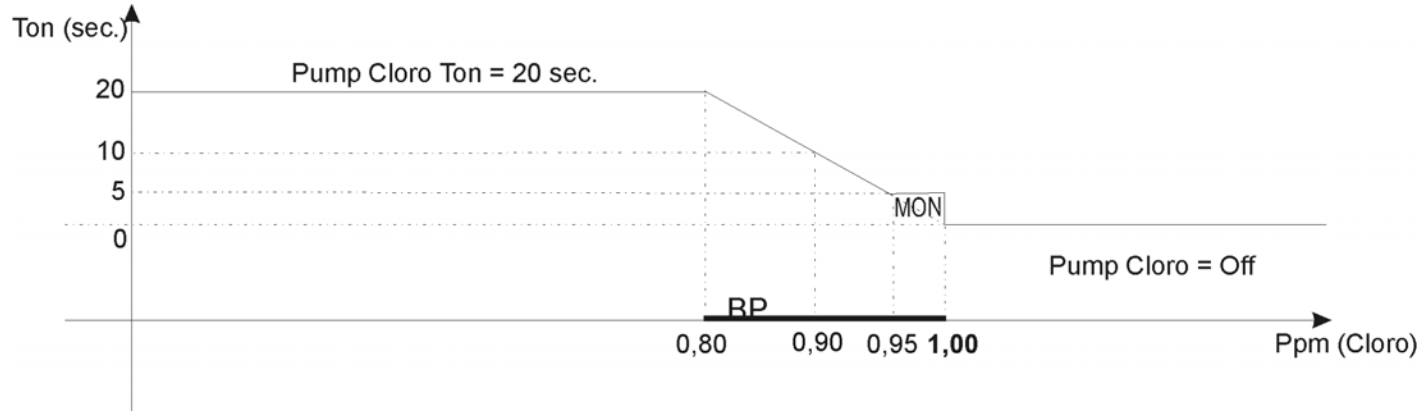
If the following values are set, proportional control in time will be obtained with a minimum Ton of the metering pump in the region of the Set Point.

| VARIABLES | PERMISSIBLE LIMITS | DEFAULT VALUES | COMMENTS |
|---|---|---|---|
| | | | |
| **PH SETTINGS** | | | |
| **SET** | **7,20 pH** | **SET POINT pH** | |
| ALL | 6,50 pH | PH minimum alarm | |
| ALH | 7,90 Ph | PH maximum alarm | |
| REL | ACID | Type of control | |
| **BP** | **0,20 pH** | **Proportional band** | |
| **REG** | **PROP** | Control mode | |
| OUT | MIS | Working mode Output mA | |
| **PER** | **20 Seconds** | **Period (Reg. Prop.)** | |
| **MON** | **3 Seconds** | **Minimum ON time** | |

**Note:** It is not possible to set both the hysteresis (**HIS**) and the delay time (**DEL**) for activation of the pump.

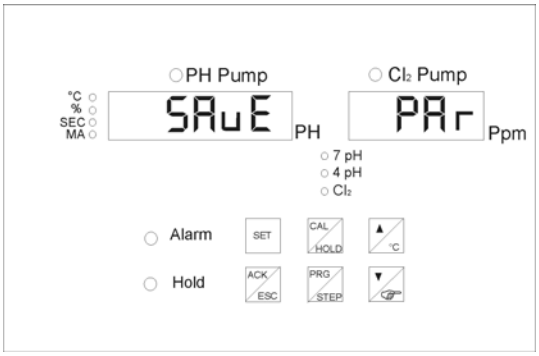



| CHLORINE SETTINGS | | | |
|---|---|---|---|
| **SET** | **1.00 ppm** | **SET POINT Chlorine** | |
| ALL | 0.60 ppm | Chlorine minimum alarm | |
| ALH | 1.50 ppm | Chlorine maximum alarm | |
| **BP** | **0.20 ppm** | **Proportional band** | |
| **REG** | **PROP** | Control mode | |
| OUT | MIS | Working mode Output mA | |
| **PER** | **20 Seconds** | **Period (Reg. Prop.)** | |
| **MON** | **3 Seconds** | **Minimum ON time** | |



## 7.4___SAVING THE PARAMETERS

To save the parameters set in the programming menu, press the ACK/ESC key , holding it down for **5 seconds** and waiting for the **SAVE PAR** message to appear.




## 7.5___PROPORTIONAL CURRENT CONTROL

Proportional current control is always possible for all types of control, by means of the following variables:

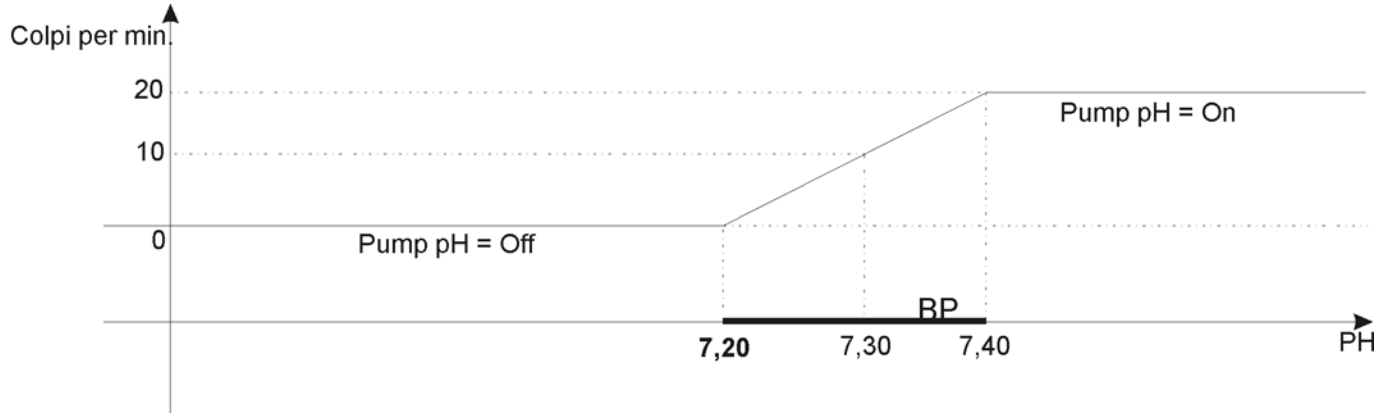
| | | | |
|---|---|---|---|
| PHS | 0 pH | Initial value for mA control | |
| PHE | 14.00 pH | End value for per mA control | |
| CLS | 0 pH | Initial value for mA control | |
| CLE | 14.00 pH | End value for per mA control | |

The variable **RMA = 0-20 mA or 4-20 mA** can be used to set the dynamics of the current output. In order to control it, it is necessary to have a pump with a current input of **0-20 mA or 4-20 mA.** The current output can also be used for a paper-type recorder.
The minimum current value **MMA** makes it possible to approach the SET POINT with a degree of metering sufficient to exceed it, otherwise in the vicinity of the set point the pump might run all the time at the minimum speed without ever stopping.

## 7.6___PULSED PROPORTIONAL CONTROL

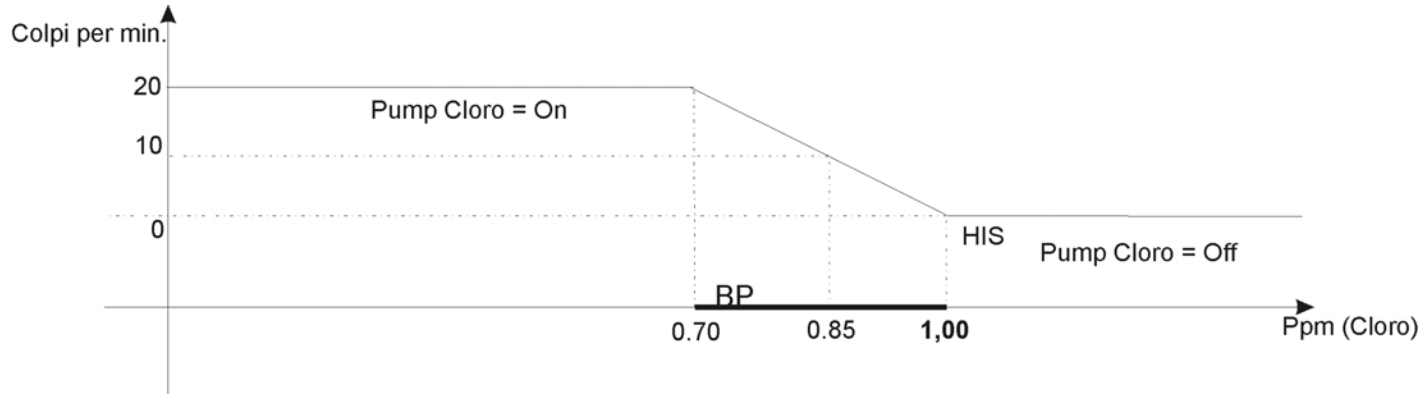
Outputs 20 and 21 (connection to the pH pump) and 22 and 23 (connection to the chlorine pump), described on page 4, can be used to connect a metering pump controlled on the basis of a number of pulses per minute.
By setting the **SPM** pH parameter and Chlorine, present in programming menu PRG2, and the proportional band (BP), it is possible to achieve control with pulses proportional to the variation of the measured value.

**Example:**
Set Point = 7.20 pH
SPM pH = 20 strokes
BP pH = 0.20 pH

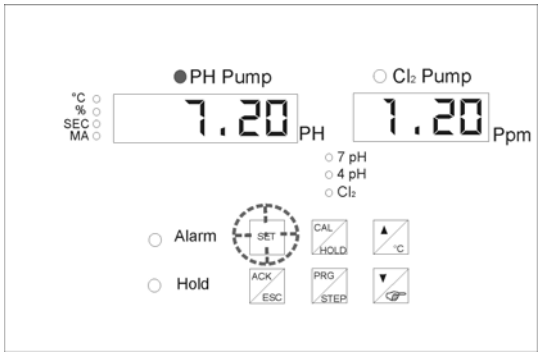



Set Point = 1.00 ppm

SPM Chlorine = 20 strokes
BP Chlorine = 0.20 ppm

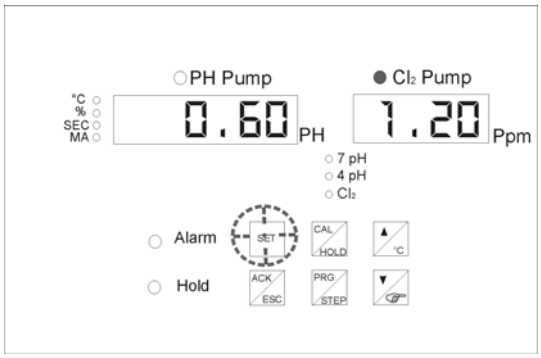



**NB.** The **SPM** parameter must not be greater than the maximum number of pulses per minute accepted by the pump.




## 7.7___SET POINT FUNCTION

With the SET key, the user can display the **SET POINTs** cyclically, and he can then use the ▲ and ▼ keys to change them without having to enter the programming mode.
If protection is provided on the terminal strip, and step **EN** has been programmed as **–C** o **--,** then it is only possible to use the SET key to display the **SET POINTs** without being able to change them.




## 7.8___MANUAL CONTROL AND PRIMING THE PUMPS.

Keeping the ▼ key depressed, it is possible to activate the relays controlling the pH and chlorine pumps in sequence by pressing the SET key at the same time.
This function is useful for operations for priming the pumps.

## 7.9___FLOW ALARM

A flow sensor is connected to terminals **13 and 14**. The sensor is positioned in the piezometric overflow device of the POOL TOP system. If the flow of water drops so much that measurement is prejudiced, the instrument is triggered, stopping chlorination and generating an alarm.
The flow alarm is activated if the gating remains active uninterruptedly for **40 seconds** . In this case, in addition to seeing the alarm LED flashing on the pH measurement display, the indication **FLUS** will appear, alternating with the measured value.
**N.B**. In the flow alarm status, the current outputs are forced to **0 mA**.

## 7.10___PROTECTING THE PROGRAMMING

The parameters that have been programmed can be protected by creating a bridge on the terminal strip between terminals **12 and 14**.
In this way it will no longer be possible to change the working data of the instrument.
If the PRG/STEP key is pressed, the indication **DIS** will appear on the display instead of **PROG,** to show that the programming function is disable.
Protection of the programming is connected with step **En** , in which it is possible to enable the functions for setting the **SET** and for calibration even when programming is protected.

**EN S- / -C / SC / --**

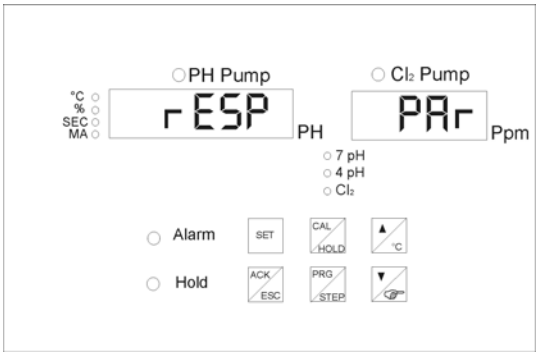
Function for enabling the lower programming levels when protection of the programmed data is provided on the terminal strip.

**S-**: the **SET** key remains active.
**-C**: the **CAL** key remains active.
**SC**: the **SET** and **CAL** keys both remain active.
--: No keys remain active.

**NOTE:** Terminals **12 and 14** can be connected to an external key-operated switch thanks to which only authorised personnel will be in a position to enable the instrument.

## 7.11___RE-SETTING THE PARAMETERS

To eliminate the old calibrations and reset the default parameters in the programming menu, proceed as follows:
Switch off the instrument
press the PRG/STEP key until the message **RESP PAR** appears on the display.
Press the CAL/HOLD key 10 seconds.
The instrument will show the message **Save par**.

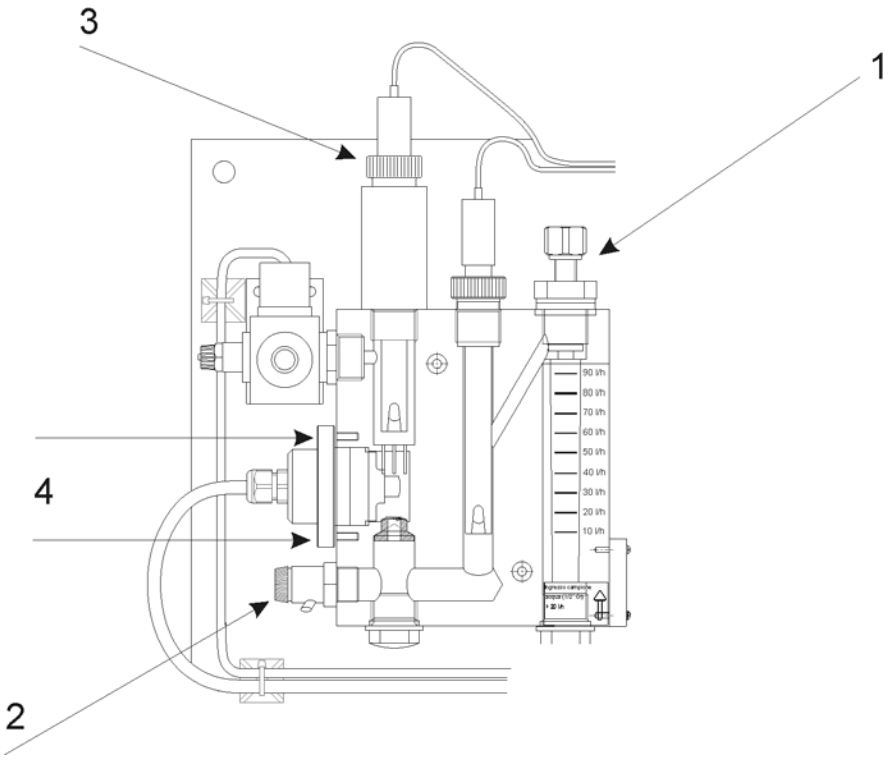


## 7.12___Maintenance and cleaning of the chlorine probe

**<u>Take care not to drop the glass balls contained inside the probe.</u>**

Carry out the following steps:

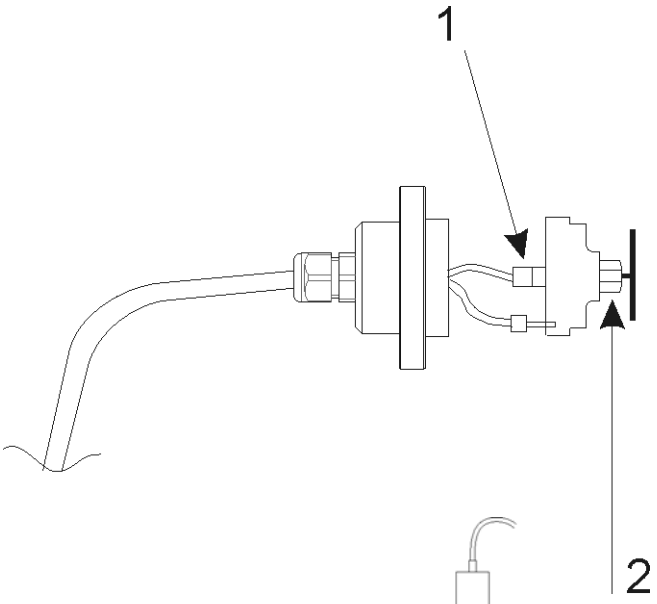
1. Close the flow of water.
2. Open the bleeder valve to empty the circuit.
3. Unscrew the pH probe to facilitate emptying of the circuit.
4. When the circuit is empty, unscrew the chlorine probe and remove it, <u>taking great care not to drop the glass balls.</u>




**Cleaning the copper electrode:**

1. Unhook the fast-on (connection to platinum electrode).
2. Unscrew the electrode

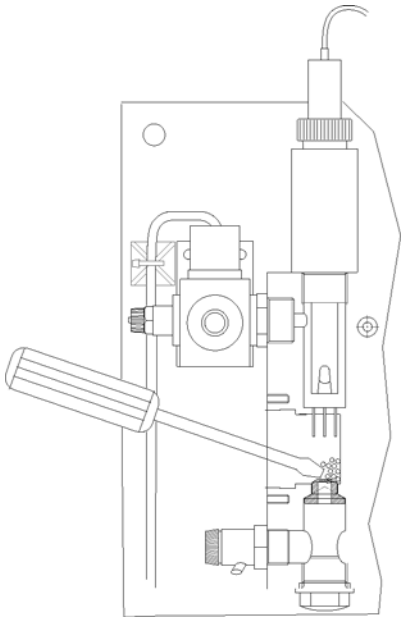
Take care not to deform the platinum spiral, and store in a safe place.
Rub the copper electrode with the brush included in the supply in order to make it shine.
After completing this operation, put the parts back into place taking care not to deform the platinum the electrode.




**Replacing the glass balls.**

To replace the glass balls, proceed as follows:

1. Wet the balls included in the supply with water.
2. Use a flat-bladed screwdriver to position them inside the probe.
3. After completing this task, close all the parts of the probe.



## 8___PROGRAMMING MEMO

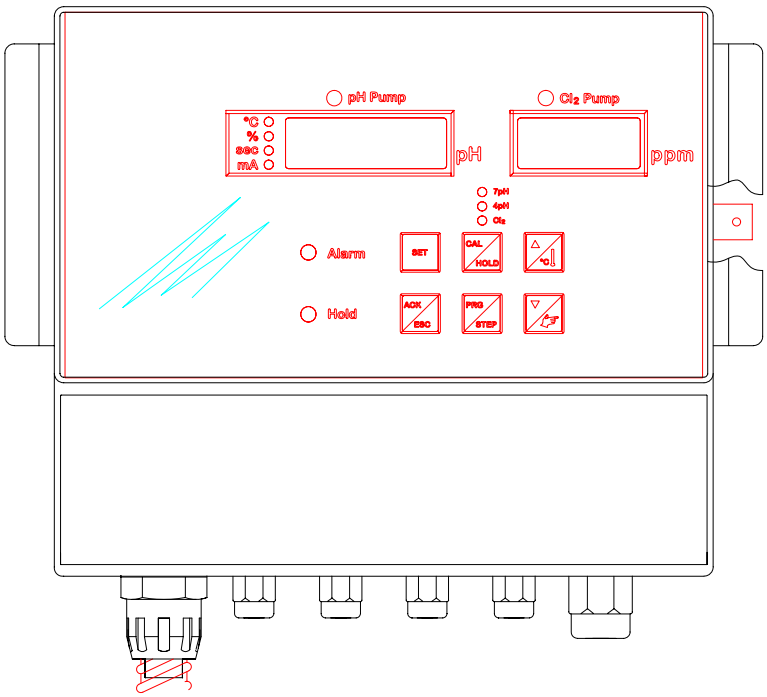
| VARIABLES | DEFAULT VALUES | SETTINGS | COMMENTS |
|---|---|---|---|
| | | | |
| **PH SETTINGS** | | | |
| SET | 7.20 pH | | pH SET POINT pH |
| ALL | 6.50 pH | | pH minimum alarm |
| ALH | 7.90 pH | | PH maximum alarm |
| REL | ACID | | Type of control |
| PRS | NO | | Status of the pH relay |
| DEL | 0 Seconds | | Delay time, pH metering |
| SPM | 20 Strokes/min. | | Strokes/minute, Output Freq. |
| BP | 0.50 pH | | Proportional band (pH) |
| REG | ONOF | | Control mode |
| OUT | MIS | | MA output working mode |
| HIS | 0.00 pH | | Hysteresis (pH) |
| RMA | 4-20 mA | | MA output dynamics |
| MMA | 0.1 mA | | Offset Output mA |
| PHS | 0 pH | | Initial value for reg. mA |
| PHE | 14.00 pH | | End value for per reg. mA |
| Ton | 0 Seconds | | ON time (Reg. Puls.) |
| Tof | 0 Seconds | | OFF time (Reg. Puls.) |
| BND | 0.00 pH | | Safety band |
| PER | 500 Seconds | | Period (Reg. Prop.) |
| MON | 0 Seconds | | Minimum ON time |
| DB | 0 % of BP | | dead band (reversed hysteresis) |
| | | | |
| **CHLORINE SETTINGS** | | | |
| SET | 0.60 ppm | | Chlorine SET POINT |
| ALL | 0.30 ppm | | Chlorine minimum alarm |
| ALH | 1.50 ppm | | Chlorine maximum alarm |
| REL | LO | | Type of control |
| PRS | NO | | Status of chlorine relay |
| DEL | 0 Seconds | | Chlorine-metering delay time |
| SPM | 20 Strokes/min. | | Strokes/minute, Output Freq. |
| BP | 0,50 pH | | Proportional band |
| REG | ONOF | | Control mode |
| OUT | MIS | | Working mode Output mA |
| HIS | 0.00 ppm | | Hysteresis |
| RMA | 4-20 mA | | MA output dynamics |
| MMA | 0,1 mA | | Offset Output mA |
| CLS | 0 ppm | | Initial value for reg. mA |
| CLE | 5.00 ppm | | End value for per reg. mA |
| Ton | 0 Seconds | | ON time (Reg. Puls.) |
| Tof | 0 Seconds | | OFF time (Reg. Puls.) |
| BND | 0.00 ppm | | Safety band |
| PER | 500 Seconds | | Period (Reg. Prop.) |
| MON | 0 Seconds | | Minimum ON time |
| DB | 0 % of BP | | dead band (reversed hysteresis) |
| CTP | 0 %/°C | | Coefficient for offsetting the measured value in relation to the temperature expressed in %/°C. |
| CPH | OFF | | Enables correction of the chlorine measurement in relation to the pH |
| | | | |
| **ENABLING** | | | |
| EN | SC | | Enables the Cal and Set keys |
| ID | 1 | | Indicates the ID of the multi-point serial network |
| BR | 2400 | | Baud rate of RS485 serial link |

# Manuale Istruzioni

## PC95

(cod. 136317)

pH – cloro – temperatura




Manuale: 0000136317
Versione: r 2.0

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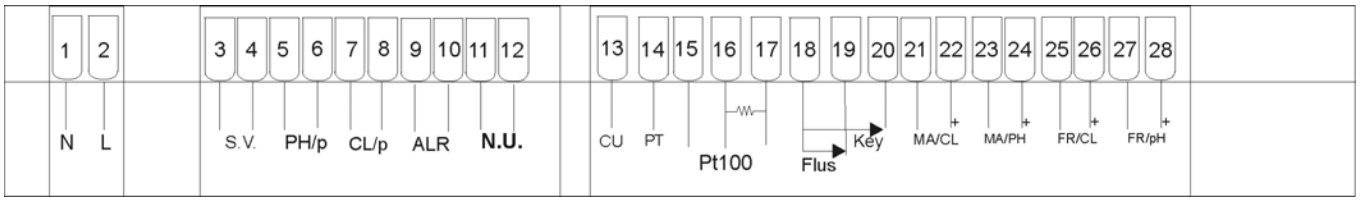
# 1___DATI TECNICI

| | |
|---|---|
| DIMENSIONI: | 240 mm – 245 mm – 140 mm |
| GRADO DI PROTEZIONE: | IP65 PROTEGGENDO IL BNC DELL'ELETTRODO pH |
| SEZIONE DEI MORSETTI: | $4mm^2$ , o diametro 2,4 mm |
| ALIMENTAZIONE: | standard 230V ± 10% 50-60 Hz a richiesta 115V |
| ASSORBIMENTO: | 15W |
| MASSIMA PORTATA SUI RELE': | 3A 250Vac (con carico resistivo) |
| TEMPERATURA DI LAVORO | 0…50 ° C |
| 1.1 TEMPERATURA DI STOCCAGGIO | -10…+70 °C |
| SCALA DI MISURA DEL pH: | 0…14,00 pH |
| IMPEDENZA D'INGRESSO: | > $10^{13}$ ohm |
| COMPENSAZIONE IN TEMPERATURA: | MANUALE/AUTOMATICA 0…125 °C |
| REGOLAZIONE SUL SET POINT: | ON/OFF<br>PAUSA / LAVORO<br>PROPORZIONALE IN CORRENTE |
| Ripetizione remota della misura: | 0/4…20 mA separata galvanicamente<br>Completamente configurabile per ritrasmissione misura o regolazione<br>Risoluzione 255 punti<br>Massimo carico 1 K ohm |
| SCALA DI MISURA DEL Cl: | 0…5,00 ppm o mg/l |
| COMPENSAZIONE IN TEMPERATURA: | Escludibile<br>MANUALE/AUTOMATICA 0…125 °C |
| COMPENSAZIONE IN pH: | Escudibile<br>Range di compensazione 6…8.35 pH |
| REGOLAZIONE SUL SET POINT: | ON/OFF<br>PAUSA / LAVORO<br>PROPORZIONALE IN CORRENTE |
| USCITA RITRASMESSA : | 0/4…20 mA separata galvanicamente<br>Completamente configurabile per ritrasmissione misura o regolazione<br>Risoluzione 255 punti<br>Massimo carico 1 K ohm |

N.B. Nelle acque di piscina trattate con **DICLORO** o **TRICLORO** isocianurato è importante fare un buon ricambio d'acqua affinché il residuo acido isocianurato non superi i 50 ppm per garantire una buona misura del cloro.

## 2___CONNESSIONE ALLA MORSETTIERA:

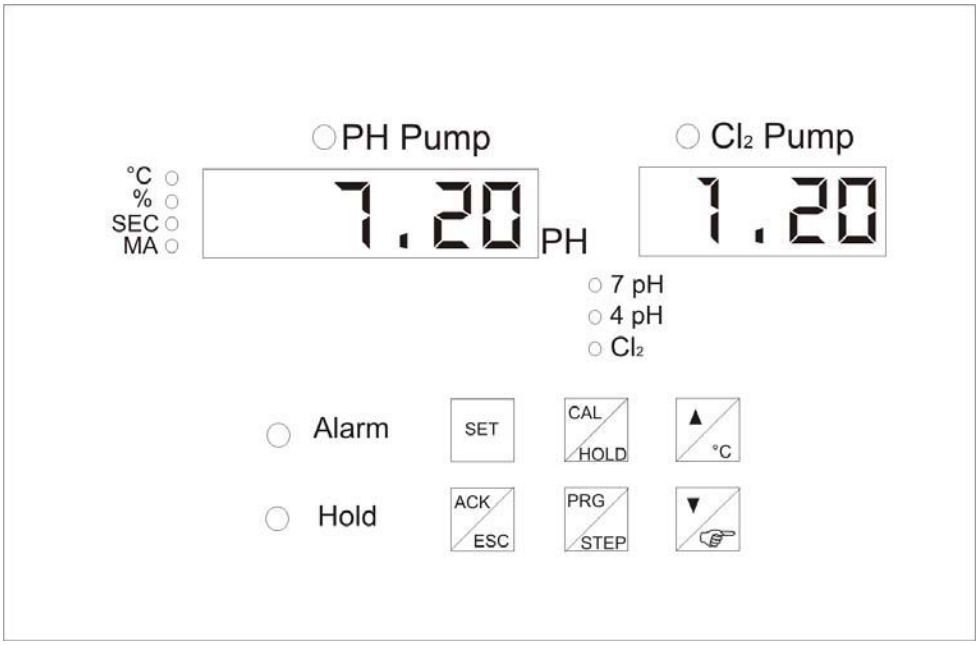



| N. Morsetto | Descrizione |
|---|---|
| 1 | NEUTRO |
| 2 | FASE |
| | |
| 3 – 4 | RELE' E.V. (ELETTROVALVOLA) |
| 5 – 6 | RELE' POMPA PH |
| 7 – 8 | RELE' POMPA CLORO |
| 9 – 10 | RELE' ALLARME |
| 11 – 12 | NON USATO |
| 13 | ELETTRODO DI RAME |
| 14 | ELETTRODO DI PLATINO |
| 15 | INPUT PT100 |
| 16 | INPUT PT100 |
| 17 | INPUT PT100 |
| 18 – 19 | INPUT SEGNALE FLUSSO |
| 19 – 20 | INPUT SEGNALE KEY |
| 21 | USCITA PROP. CORRENTE CL (POLO NEGATIVO) |
| 22 | USCITA PROP. CORRENTE CL (POLO POSITIVO) |
| 23 | USCITA PROP. CORRENTE PH (POLO NEGATIVO) |
| 24 | USCITA PROP. CORRENTE PH (POLO POSITIVO) |
| 25 | USCITA PROP. FREQ. CL (POLO NEGATIVO) |
| 26 | USCITA PROP. FREQ. CL (POLO POSITIVO) |
| 27 | USCITA PROP. FREQ. PH (POLO NEGATIVO) |
| 28 | USCITA PROP. FREQ. PH (POLO POSITIVO) |

**NOTE:**

FACENDO UN PONTE TRA IL MORSETTO 15 E 17 LO STRUMENTO RICONOSCE CHE LA SONDA E' SCOLLEGATA E SI RIFERISCE ALLA REGOLAZIONE MANUALE.

# 3___PANNELLO DEI COMANDI




## DESCRIZIONE GENERALE DELLA TASTIERA

| | |
|---|---|
| SET | Visualizza in sequenza i set point impostati, se la funzione è abilitata permette di variarne il valore. Usato contemporaneamente al tasto MAN permette di forzare lo stato dei relè di set. |
| PRG STEP | Premendo il tasto appare la scritta PrOG , mantenendo premuto il tasto per 5 secondi si entra in programmazione. Se il tasto è inibito dalla protezione fatta in morsettiera premendolo appare la scritta dIS.<br>Quando si entra in programmazione ogni volta che si preme questo tasto si avanza di uno step. |
| ACK ESC | Fa retrocedere i passi di programmazione. Se si tiene premuto per 5 secondi esce dalla funzione programmazione, salva tutti i dati in memoria permanente. Spegne il relè di allarme, ma se lo stato di allarme persiste il LED corrispondente da lampeggiante diventa fisso e resta acceso fino a quando non viene rimossa la causa di allarme. Elimina un messaggio di errore e ripristina per default il dato errato |
| ▲ °C | Incrementa il valore visualizzato in fase di programmazione Incrementa il valore visualizzato con il tasto SET.<br>Visualizza la temperatura di riferimento ( manuale o automatica ) Se la temperatura è manuale premuto contemporaneamente al tasto DOWN |
| ▼ | Permette di variare il valore di temperatura Decrementa il valore visualizzato in fase di programmazione.<br>Decrementa il valore visualizzato con il tasto SET.<br>Abilita la funzione manuale, se premuto contemporaneamente al tasto SET permette di forzare in manuale i relè di comando delle pompe. |
| CAL HOLD | Permette di entrare nel Menù di calibrazione. |

## DESCRIZIONE GENERALE DEGLI INDICATORI LUMINOSI

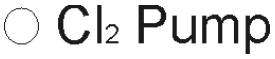
**Display della misura pH**

**Display della misura cloro**

**Diodo led bicolore. Indica lo stato della pompa pH**

| | |
|---|---|
| **SPENTO** | La pompa del pH è spenta |
| **VERDE** | Il set point è attivo ma la pompa è temporaneamente spenta |
| **ROSSO** | Il set point è attivo e la pompa è accesa |
| **ROSSO LAMPEGGIANTE** | In fase di programmazione sta ad indicare che il parametro visualizzato si riferisce al controllo del set point pH. |

**Diodo led bicolore. Indica lo stato della pompa cloro**




| | |
|---|---|
| **SPENTO** | La pompa del cloro è spenta |
| **VERDE** | Il set point è attivo ma la pompa è temporaneamente spenta |
| **ROSSO** | Il set point è attivo e la pompa è accesa |
| **ROSSO LAMPEGGIANTE** | In fase di programmazione sta ad indicare che il parametro visualizzato si riferisce al controllo del set point Cl. |

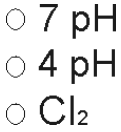
**Diodo led Rosso. Indica uno stato di ALLARME.**

| | |
|---|---|
| **ROSSO LAMPEGGIANTE** | Si è verificato uno stato di allarme il relè allarme è attivo, per spegnere l'allarme premere il tasto ACK. |
| **ROSSO** | E' stato riconosciuto un allarme con il tasto ACK ma la causa che lo aveva generato è ancora presente, rimuovendo la causa il led alarm si spegne. |

**Diodo led Rosso. Indica uno stato di arresto totale delle funzioni dello strumento.**

**ROSSO** Quando è acceso segnala il blocco temporaneo del funzionamento delle pompe, le uscite in corrente restano bloccate all'ultimo valore ritrasmesso.

**FUNZIONI DI CALIBRAZIONE**




| | |
|---|---|
| **7 pH** | Lo strumento chiede che l'elettrodo sia immerso in una soluzione campione a 7 pH pertanto è pronto per operare una calibrazione dell'offset sull'elettrodo pH. |
| **4 pH** | Lo strumento chiede che l'elettrodo sia immerso in una soluzione campione a 4 pH pertanto è pronto per operare una calibrazione del guadagno sull'elettrodo pH |
| **$Cl_2$** | Lo strumento è pronto per fare una auto calibrazione della misura del cloro, aspetta l'inserimento del valore di cloro determinato con il metodo DPD. |

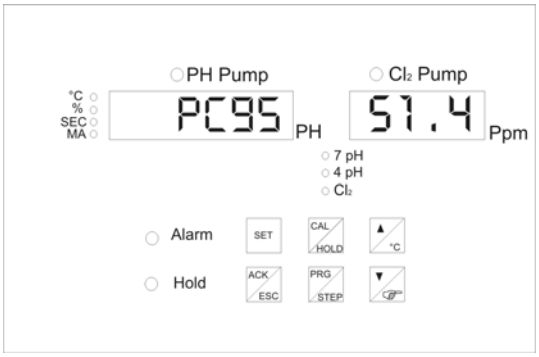
**UNITA' DI MISURA**

°C ○
% ○
SEC ○
MA ○

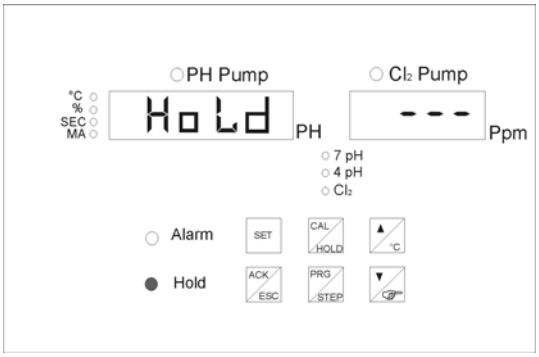
| | |
|---|---|
| **°C** | Il valore numerico visualizzato è una temperatura espressa in °C<br>Se questo indicatore è acceso contemporaneamente al % significa che il valore numerico visualizzato è un coefficiente di correzione in funzione della temperatura espresso in %/°C. |
| **%** | Il valore numerico visualizzato è una percentuale |
| **SEC**. | Il valore numerico visualizzato è una unità di tempo espressa in secondi |
| **mA** | Il valore numerico visualizzato è un valore di corrente d'uscita espresso in mA o è un parametro di programmazione che agisce su una uscita in corrente. |

# 4___ACCENSIONE ED IMPOSTAZIONI PRELIMINARI

Lo strumento presenta all'accensione il messaggio **PC95 S 14** che indica il nome e la revisione software che è stata caricata.

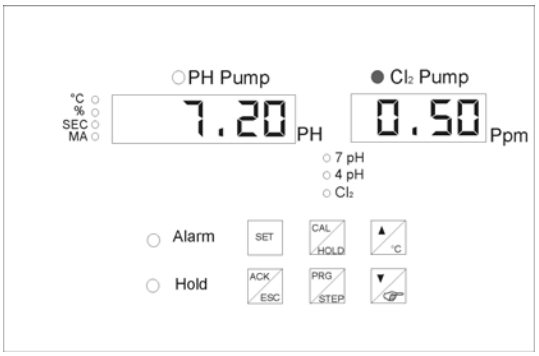



Lo strumento visualizza il messaggio **HOLD ---** dopo un tempo circa 10 secondi di attesa, nel quale lo strumento esegue un test software, lo strumento visualizza la misura del pH e del cloro, chiaramente tali valori non sono veritieri in quanto non è stata eseguita la calibrazione delle sonde.




**Attenzione!!!**
Spegnere le pompe prima di accendere lo strumento perché potrebbe provoca un dosaggio errato in virtù dell'errore di misura poc'anzi evidenziato.

Aprire il flusso d'acqua nel pannello ed impostare attraverso il flussometro un portata pari a **60 Litri/ora** per garantire un buona rotazione delle sfere presenti nella sonda cloro.

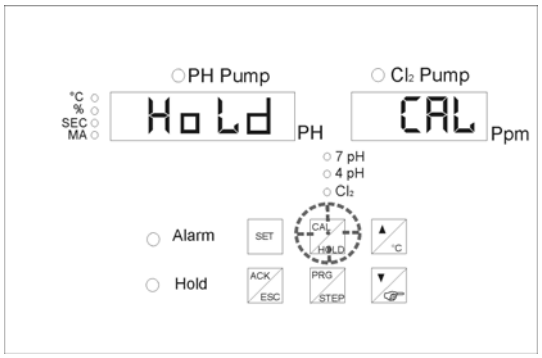



Regolazione valori ph = 7.00 ph  e cloro = 1.00 ppm (circa) manualmente e far circolare l'acqua nel pannello circa 4 ore per adattamento sonda ph e cloro,

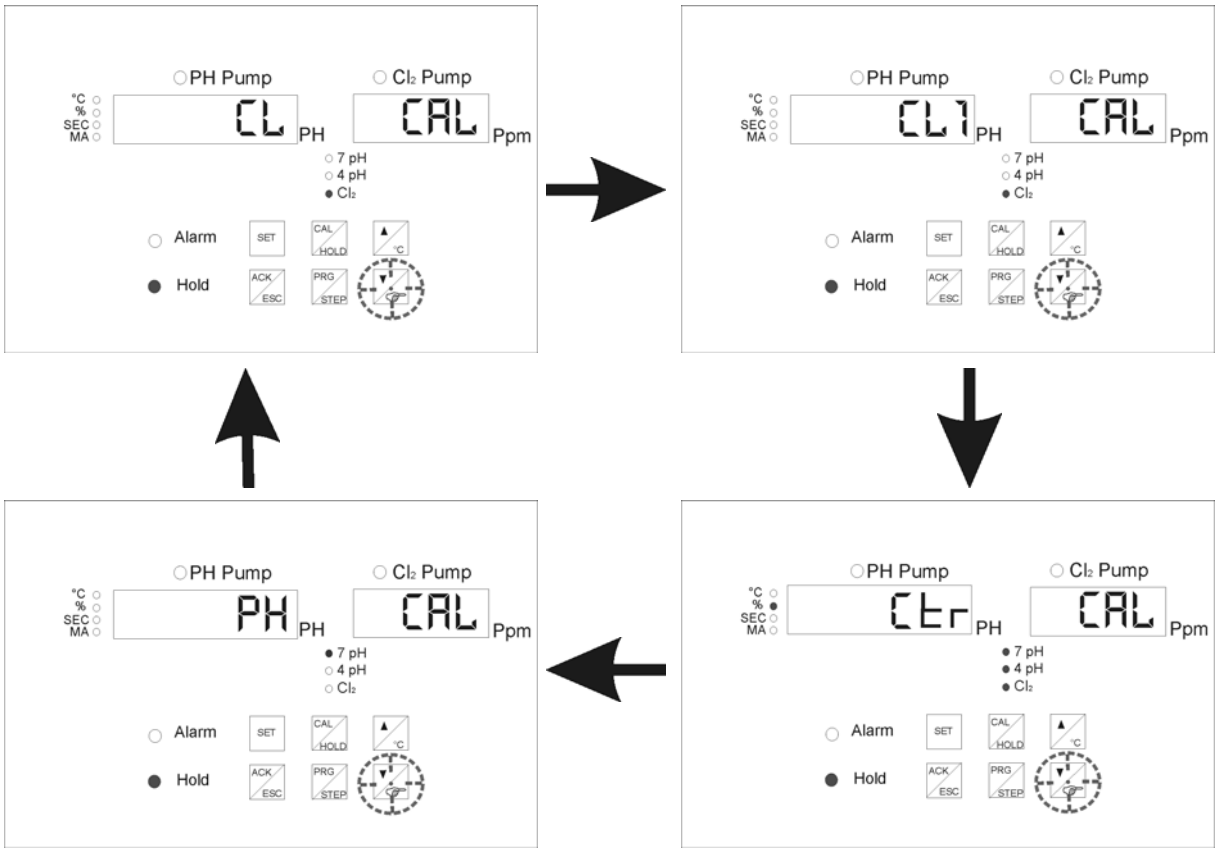
Nella spiegazioni successivi dei menù e delle funzioni dello strumento verrà utilizzato questo simbolo per indicare i tasti da premere

# 5___CALIBRAZIONE

Per entrare nel menù calibrazione tenere premuto il tasto CAL/HOLD per **5 secondi**, lo strumento visualizza il messaggio **Hold Cal** dopo tale tempo si visualizza il messaggio **CL CAL** con il **led Hold** acceso.




Utilizzando il tasto ▼ seguiranno ciclicamente le voci **CL1, CTR, PH, CL**.



## 5.1___CALIBRAZIONE SONDA pH

L'elettrodo di pH va periodicamente ricalibrato fino a quando per un suo ecessivo esaurimento non ne necessiti la sostituzione.
L'operazione di calibrazione dell'elettrodo viene asservita in modo semiautomatico dallo strumento PC95 che riconosce in modo autonomo il valore dello standard di soluzione campione nella quale è immerso l'elettrodo e visualizza un parametro di qualità ad indicare il grado di esaurimento.

Materiale necessario per la calibrazione:

1) **Soluzione tampone 7 pH ben conservata (BOCCETTA N° 1)**
2) **Soluzione tampone 4 o 9.22 pH ben conservata (BOCCETTA N° 3)**
3) **Acqua pulita per lavare l'elettrodo (BOCCETTA N° 2)**

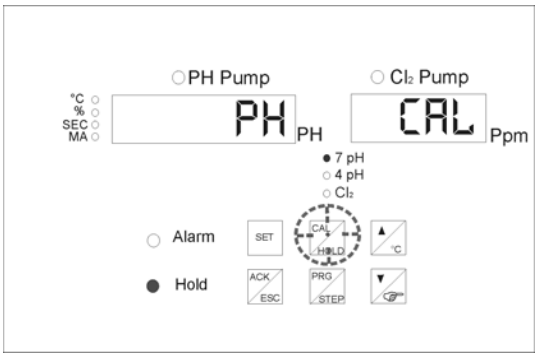
**NOTE:**
Una soluzione a **4 pH** è sempre da preferire ad una soluzione a **9 o 10 pH**, si tratta di un valore di pH molto più stabile nel tempo e non influenzato dalla temperatura.
Durante la fase di calibrazione evitare d'inserire l'elettrodo nelle soluzioni tampone senza averlo accuratamente lavato, **non asciugare l'elettrodo strofinandolo con carta o stracci** ma lasciarlo sgocciolare naturalmente.
Le soluzioni tampone conservatele sempre in luogo scuro e fresco, evitate l'uso di una soluzione per più di un anno.

**PROCEDURA**

1. Entrare nel menù calibrazione (**Vedi Pag 8**) ed individuare la funzione **PH CAL**

2. Confermare con il tasto CAL/HOLD per procedere con una calibrazione della sonda **pH**.

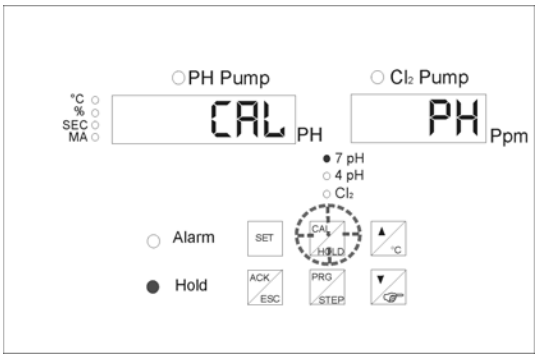
3. A questo punto appare la scritta **CAL** lampeggiante **PH**
con il **led 7 pH** lampeggiante.




4. Estrarre l'elettrodo di pH dalla vaschetta.

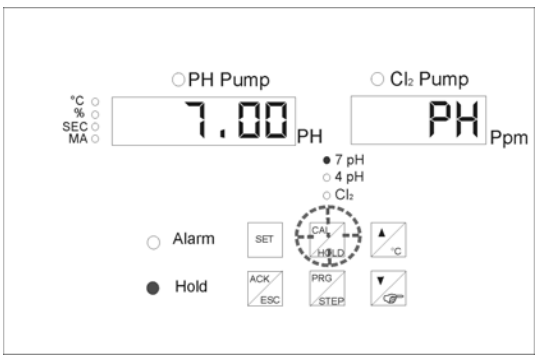
5. Lavare l'elettrodo nella **boccetta n° 2**
contenente **acqua pulita**.

6. Immergere l'elettrodo nella **boccetta n° 1** con la soluzione
**7 pH** per un tempo di **15 secondi**.

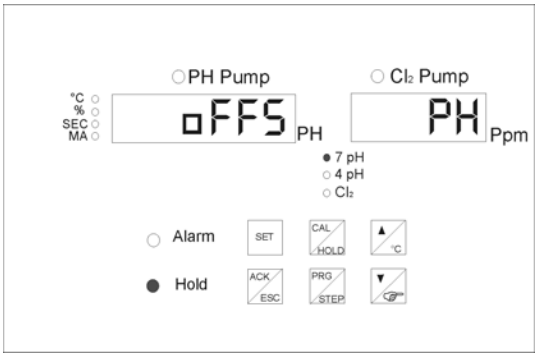



7. Premere il tasto CAL/HOLD

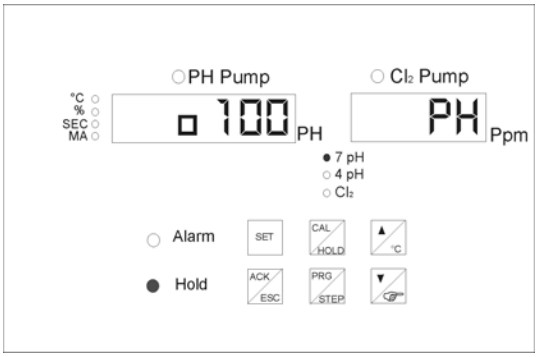
8. Sul display appare la scritta **7.00** se riconosce la soluzione
Tampone.
(In caso di errore sostituire la soluzione tampone)



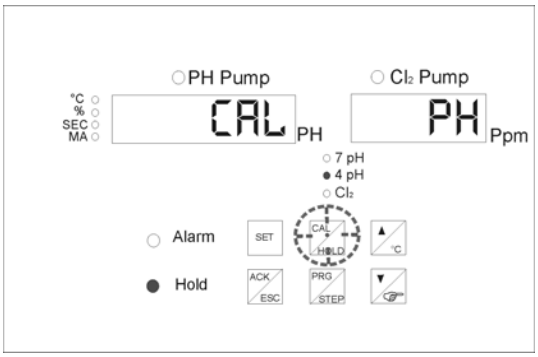
9. Premere il tasto CAL/HOLD il valore della soluzione tampone Riconosciuta.




10. Premere il tasto CAL/HOLD sul display appare la scritta **OFFS PH** attendere **30 secondi** per la calibrazione della sonda.
Lo strumento calcola il valore di **OFFSET** e visualizza la bontà dell'elettrodo in percentuale.




11. Dopo **5 secondi** sul display appare la scritta **CAL PH** e il **led 4 pH** lampeggiante

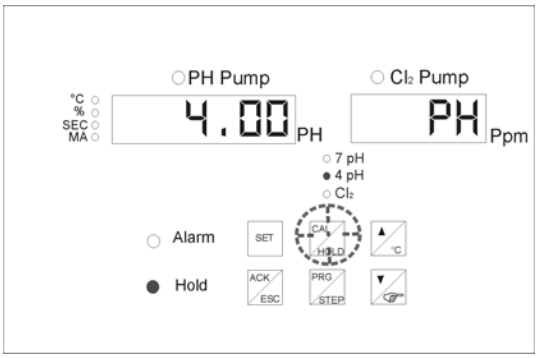



12. Lavare l'elettrodo nella **boccetta n° 2** contenente acqua pulita.

13. Immergere l'elettrodo nella **boccetta n° 3** con la soluzione **4 pH** per un tempo di **15 secondi**.

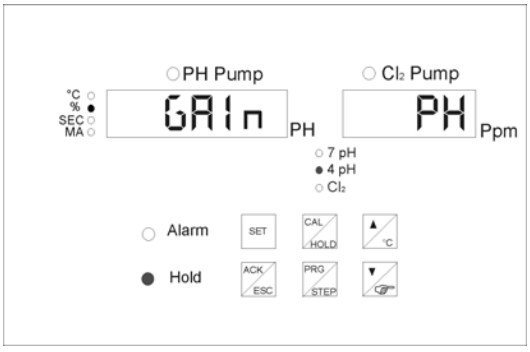
14. Premere il tasto CAL/HOLD

15. Sul display appare il valore della soluzione tampone Riconosciuta.
(In caso di errore sostituire la soluzione tampone)

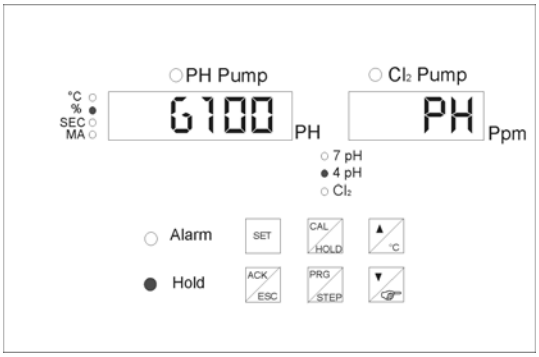



16. Se utilizzate una diversa correggere il valore della soluzione tampone con i tasti ▲ °C ▼

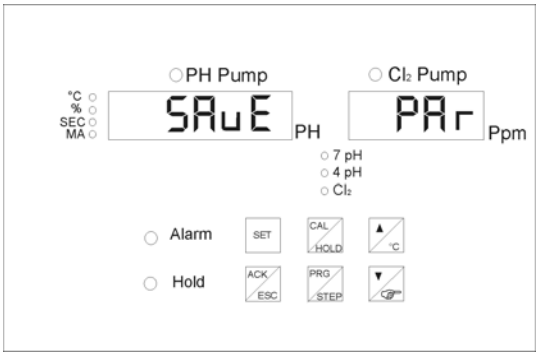
17. Premere il tasto CAL/HOLD . sul display appare la scritta **GAIN PH** attendere **30 secondi**
Lo strumento calcola il valore di **GAIN** e visualizza la bontà dell'elettrodo in percentuale.



18. Lo strumento salva i parametri calcolati e visualizza per un secondo sul display **SAVE PAR**. Esce dal menù calibrazione e si rimette in stato di misura, resta attivo lo stato di **HOLD**.




19. Riposizionare l'elettrodo nella vaschetta riaprire il flusso d'acqua regolandolo a **60 litri/ora**, premere il tasto ACK/ESC per eliminare lo stato di **HOLD**.




## 5.2___CALIBRAZIONE SONDA CLORO

### 5.2.1___INIZIALE

**<u>Questa calibrazione deve essere eseguita ogni qualvolta viene sostituito il 20% o percentuale superiore, dell'acqua contenuta nella piscina.</u>**

Se la cella di misura è nuova svuotarla dall'acqua e pulire bene l'elettrodo di rame con l'apposita spazzolino **(pag. 29)**, ravvivare la superficie a contatto con l'acqua fino a renderla lucida, LASCIARE CIRCOLARE ACQUA CLORATA PER 4 ORE.

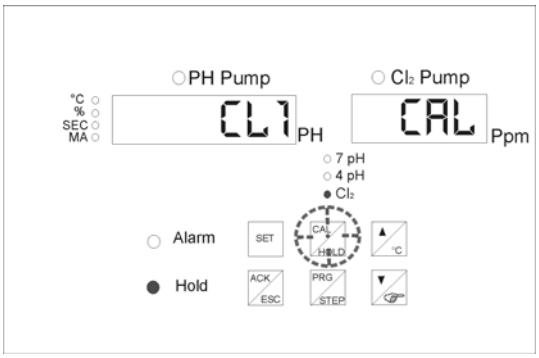
**N.B.** <u>UNA PRIMA CALIBRAZIONE VA FATTA DOPO CHE LA CELLA HA LAVORATO CON ACQUA CLORATA CON UN VALORE COMPRESO TRA **0,7 PPM** E **1,4 PPM** PER ALMENO **4 ORE**.</u>

**PROCEDURA**

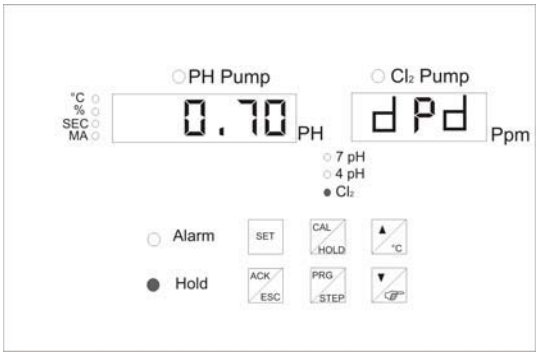
**1.** Prelevare un campione di acqua clorata dall'apposito rubinetto determinare il valore di cloro residuo libero con un metodo **DPD**

2. Entrare nel menù calibrazione (**<u>Vedi Pag 8</u>**) ed individuare la funzione **CL1 CAL**.

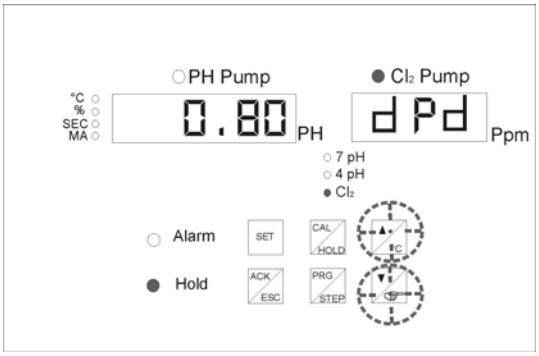
Sul display appare la scritta **CL1** con **CAL** il **led CL2** lampeggiante.




Premere il tasto CAL/HOLD

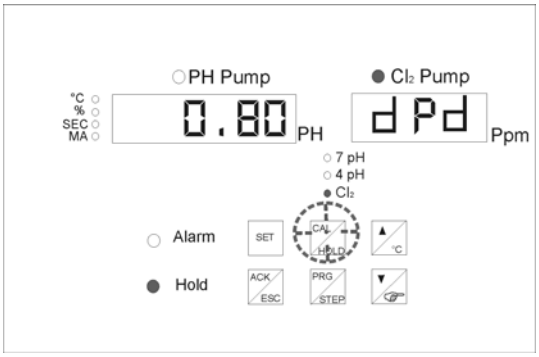


Sul display appare il valore di cloro visualizzato in quel momento con la scritta **DPD**



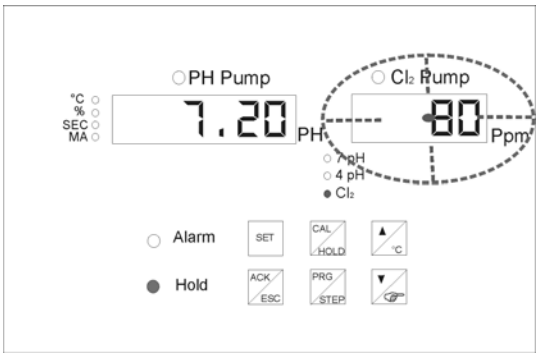

Con i tasti ▲ °C ▼ impostare il valore di cloro misurato con il metodo DPD (esempio 0.80 ppm)

Premere il tasto CAL/HOLD
L'elettrovalvola viene alimentata e chiude il flusso d'acqua

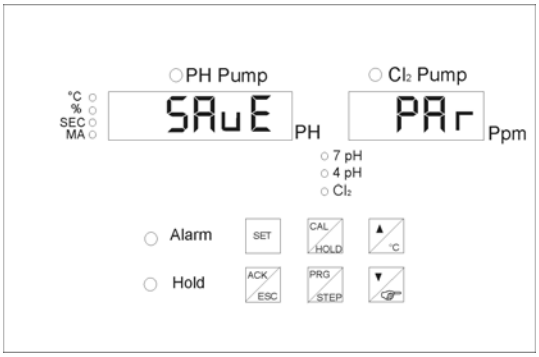



Lo strumento inizia una procedura di calibrazione automatica di **un numero di misure proporzionale alla concentrazione riscontrata:**

Esempio: 0.80 ppm = 80 misure
1,10 ppm = 110 misure




Si visualizzata sul display cloro il valore decrementale delle misure da effettuare, sull'acqua contenuta nella sonda.
L'elettrovalvola sarà alimentata per tutto il tempo di calibrazione.
Per tutta la procedura restano accesi il **led HOLD** e il **led $Cl_2$**




Lo strumento salva i parametri calcolati e visualizza per un secondo sul display **SAVE PAR**.
Esce dal menù calibrazione, toglie l'alimentazione all'elettrovalvola e ripristinando il flusso.

L'operatore può abbandonare il controllo del pannello in quanto la calibrazione è totalmente automatizzata. Il tempo di calibrazione è di circa **15 minuti per 1 ppm** di cloro.

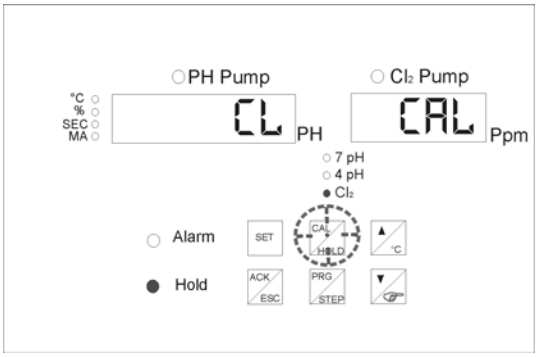
**UNA VOLTA TERMINATA UNA PRIMA CALIBRAZIONE E RISCONTRATA LA CORRETTA MISURA DELLA CONCENTRAZIONE CLORO NON OCCORRE ESEGUIRE UNA CALIBRAZIONE PERIODICA, NEL CASO CONTRARIO PROCEDERE ALLA CALIBRAZIONE PERIODICA.**

**NOTE:**
Se sul display appare la scritta lampeggiante **LOW** significa che lo strumento ritiene il valore di cloro presente nel momento della calibrazione insufficiente per fare una buona calibrazione, in ogni caso si può procedere accettando un certo margine di errore ( <= 10% ).

**5.2.2___PERIODICA**

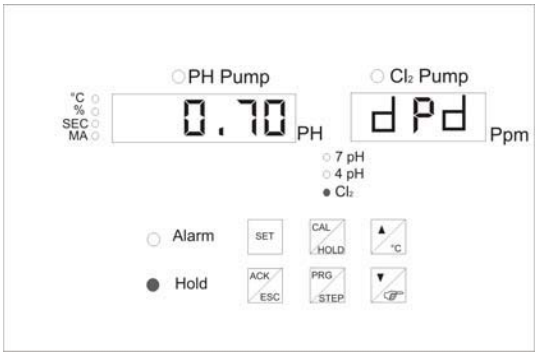
Questa funzione può essere utilizzata per migliorare la misura strumentale.
Prelevare un campione di acqua clorata dall'apposito rubinetto determinare il valore di cloro residuo libero con un metodo **DPD**

Entrare nel menù calibrazione (**Vedi Pag 8**) ed individuare la funzione **CL CAL**.

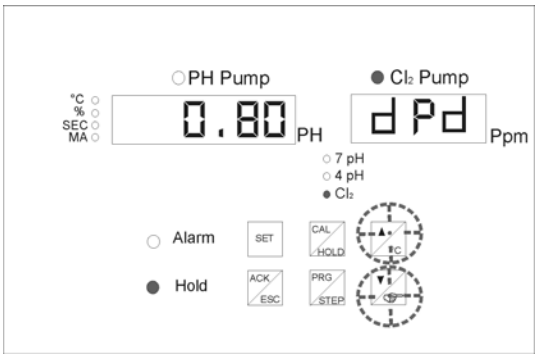



Sul display appare la scritta **CL** con **CAL** il **led CL2** lampeggiante.

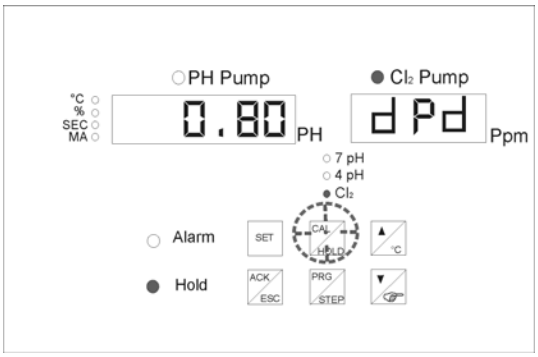
Premere il tasto CAL/HOLD




Sul display appare il valore di cloro visualizzato in quel momento con la scritta **DPD**

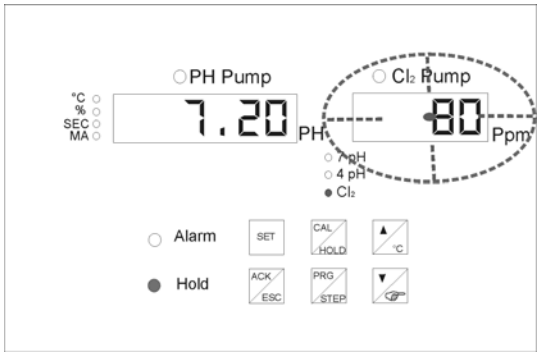



Con i tasti °C impostare il valore di cloro misurato con il metodo DPD (esempio 0.80 ppm)

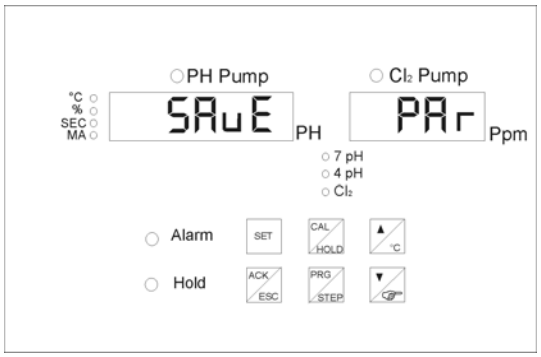



Premere il tasto CAL/HOLD
L'elettrovalvola viene alimentata e chiude il flusso d'acqua

Lo strumento inizia una procedura di calibrazione automatica di **80 misure,** visualizzata sul display, sull'acqua contenuto nella sonda.
L'elettrovalvola sarà alimentata per tutto il tempo di calibrazione.
Per tutta la procedura restano accesi il **led HOLD** e il **led $Cl_2$**




Lo strumento salva i parametri calcolati e visualizza per un secondo sul display **SAVE PAR**.
Esce dal menù calibrazione, toglie l'alimentazione all'elettrovalvola e ripristinando il flusso.




Le misure effettuate dallo strumento saranno proporzionali alla concentrazione.

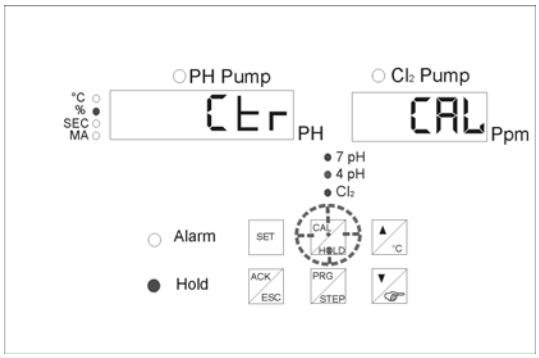
**Esempio:** 0.80 ppm = 80 misure 1,10 ppm = 110 misure

L'operatore può abbandonare il controllo del pannello in quanto la calibrazione è totalmente automatizzata. Il tempo di calibrazione è di circa **15 minuti per 1 ppm** di cloro.
Se sul display appare la scritta lampeggiante **LOW** significa che lo strumento ritiene il valore di cloro presente nel momento della calibrazione insufficiente per fare una buona calibrazione, in ogni caso si può procedere accettando un certo margine di errore ( <= 10% ).

## 5.3___VERIFICA SONDE

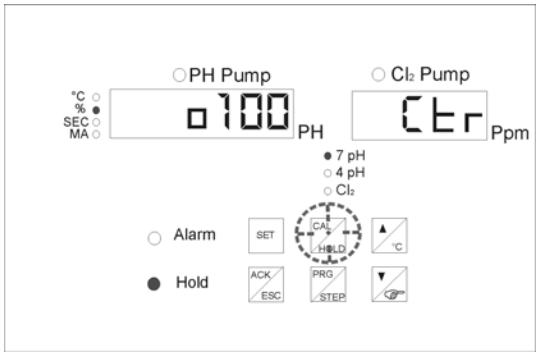
Una volta terminate le procedure di calibrazione è possibile rileggere i valori in percentuale della qualità delle sonde calibrate.

Entrare nel menù calibrazione (**Vedi Pag 8**) ed individuare la funzione **Ctr CAL**.



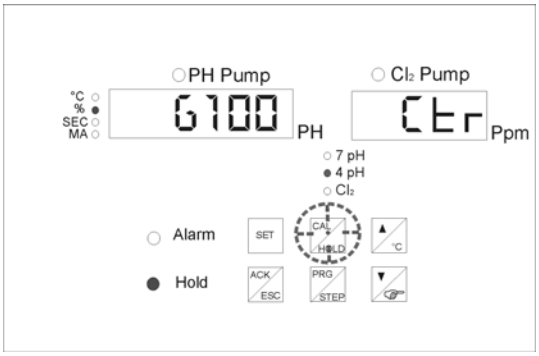

Sul display appare la scritta **Ctr CAL** con i **led 7pH, 4pH, CL2** lampeggianti.

Premere il tasto

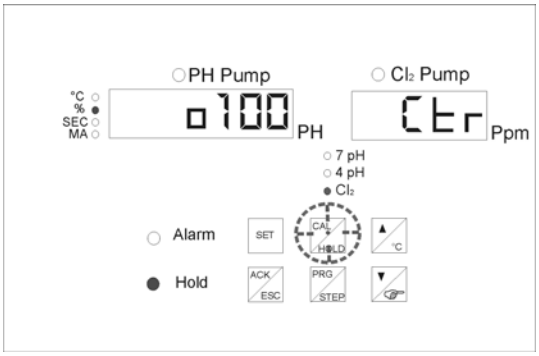

Sul display appare **o100 Ctr** con il **led 7 pH** e **%** acceso lo strumento indica la qualità OFFSET dell'elettrodo pH.

Premere il tasto CAL/HOLD



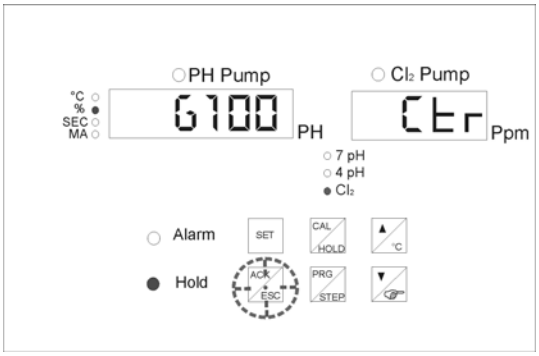

Sul display appare **G100 Ctr** con il **led 4 pH** e **%** acceso lo strumento indica la qualità GAIN dell'elettrodo pH.

Premere il tasto CAL/HOLD




Sul display appare **o100 Ctr** con il **led $Cl_2$** e **%** acceso lo strumento indica la qualità OFFSET dell'elettrodo Cloro.

Premere il tasto CAL/HOLD




Sul display appare **G100 Ctr** con il **led $Cl_2$** e **%** acceso lo strumento indica la qualità GAIN dell'elettrodo Cloro.

Per uscire dal menù premere il tasto ACK/ESC

Le indicazioni di qualità dell'elettrodo vanno considerate separatamente, un grado basso di qualità su una delle due è indice di scarsa qualità anche se l'altra indicazione è buona.

**ATTENZIONE:** Verificare sempre la qualità delle soluzioni campione di colore omogeneo.
Fare attenzione a non utilizzare soluzioni tampone aperte da più di 1 anno.

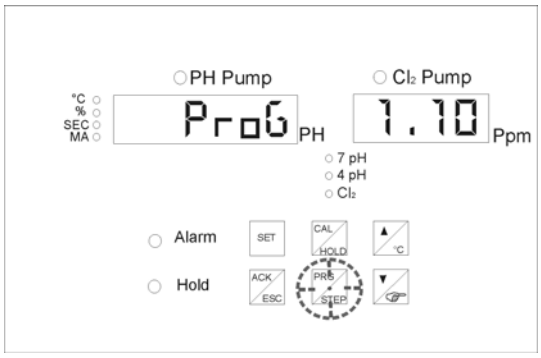
**ESEMPIO:**
Supponiamo che sulla calibrazione con 7 pH la qualità sia risultata pari al 10%, mentre sulla calibrazione con 4 pH la qualità sia risultata pari al 98%.

In questo caso è evidente che l'elemento di riferimento dell'elettrodo si è danneggiato precocemente, questo fenomeno ad esempio è tipico negli impianti di clorazione nei quali vengono fatte delle clorazioni SHOCK che tendono ad inquinare il riferimento dell'elettrodo.

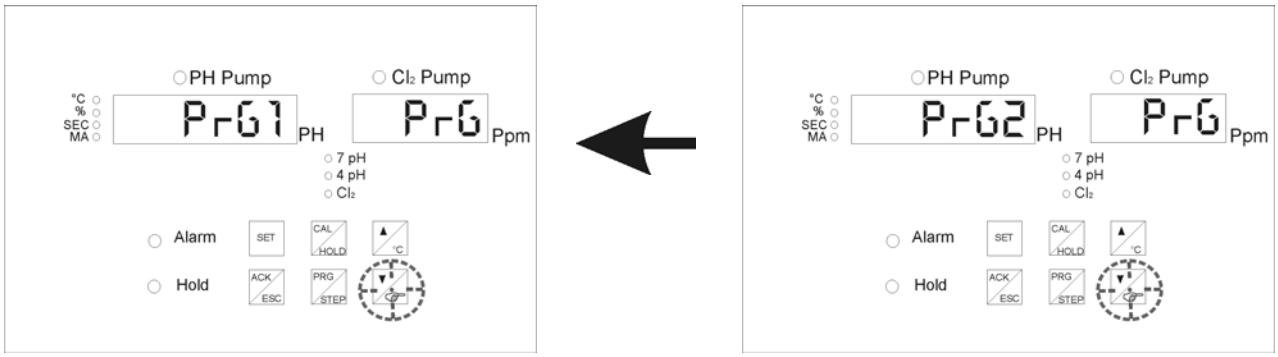
Buona norma sarebbe in questo caso o chiudere il sistema di misura nella fase di super clorazione o utilizzare gli appositi elettrodi a doppia barriera volutamente costruiti per non essere danneggiati dal cloro disciolto in acqua.

# 6___MENU PROGRAMMAZIONE

Per accedere al menù programmazione tenere premuto il tasto PRG/STEP per **5 secondi** si visualizza sul display PROG




Entra nella funzione di programmazione visualizzando la prima voce **PRG1** attraverso il tasto ▼ si può scorrere le due voce ciclicamente **PRG1** e **PRG2**.



## 6.1___ELENCO DELLE VARIABILI

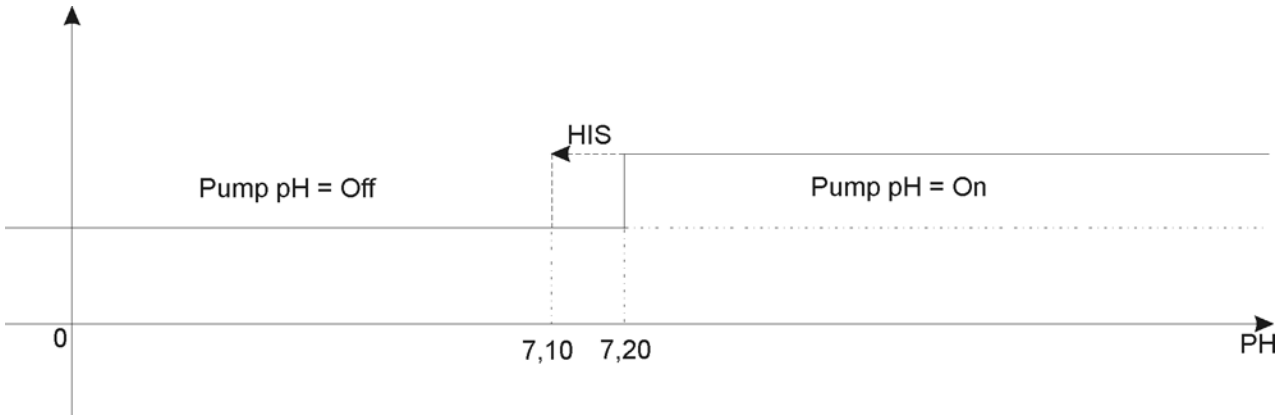
### 6.1.1___Menù PRG1

Entrare nel menù programmazione (**Vedi Pag 16**) ed individuare la funzione **PRG1**.
Le variabili visualizzate sono le seguenti:

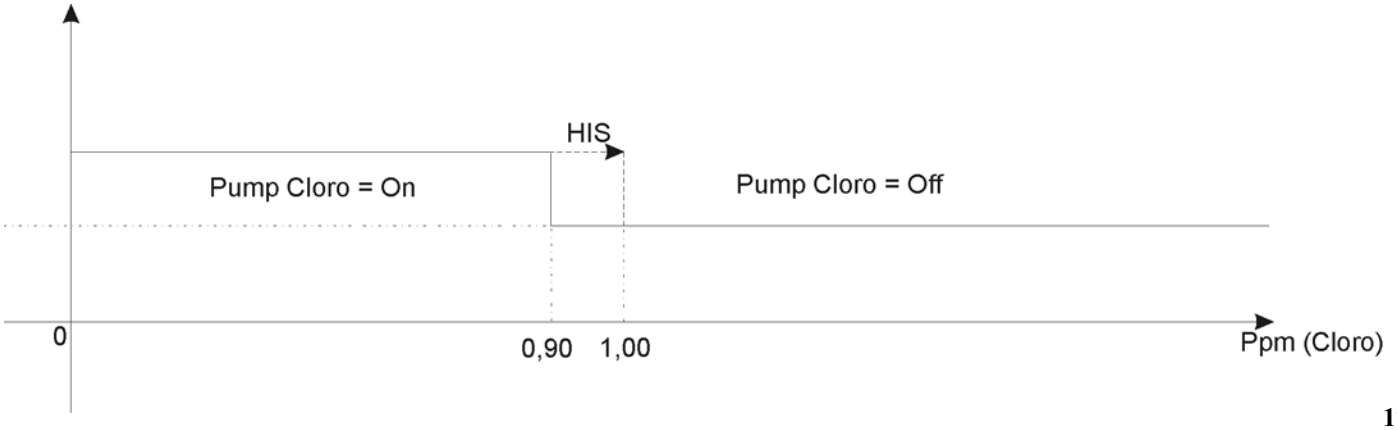
| VARIABILI | LIMITI CONSENTITI | VALORI DI DEFAULT | COMMENTO |
|---|---|---|---|
| | | | |
| **IMPOSTAZIONI PH** | | | |
| SET | 0…14,00 | 7,20 pH | SET POINT pH |
| ALL | 0…SET | 6,50 pH | Allarme minimo pH |
| ALH | SET…14,00 | 7,90 pH | Allarme massimo pH |
| REL | ACID/ALCA | ACID | Tipo di regolazione |
| HIS | 0,00…1,40 | 0,00 pH | Isteresi pH |
| | | | |
| **IMPOSTAZIONI CLORO** | | | |
| SET | 0…5,00 | 0,60 ppm | SET POINT Cloro |
| ALL | 0…SET | 0,30 ppm | Allarme minimo Cloro |
| ALH | SET…5,00 | 1,50 ppm | Allarme massimo Cloro |
| REL | LO | LO | Tipo di regolazione |
| HIS | 0,00…0,50 | 0,00 ppm | Isteresi cloro |
| CPH | ON / OFF | OFF | Abil. Alla correzione della misura cloro in funzione del pH |
| **ABILITAZIONI** | | | |
| EN | S-/-C/SC/-- | SC | Abilita i tasti Cal e Set |

Impostando queste variabili è possibile avere una regolazione ON / OFF delle pompe di dosaggio.
**Esempio:**
Il grafici rappresenta una regolazione del Set Point della misura con un valore d'isteresi diversa da zero.

SET POINT pH = 7,20 pH (SET)
Isteresi = 0,10 pH (HIS)




SET POINT CL = 0,90 ppm (SET)
Isteresi = 0,10 ppm (HIS)



### 6.1.2___Menù PRG2

Entrare nel menù programmazione (**Vedi Pag 16**) ed individuare la funzione **PRG2**.
Le variabili visualizzate sono le seguenti:

| VARIABILI | LIMITI CONSENTITI | VALORI DI DEFAULT | COMMENTO |
|---|---|---|---|
| | | | |
| **IMPOSTAZIONI PH** | | | |
| SET | 0…14,00 | 7,20 pH | SET POINT pH |
| ALL | 0…SET | 6,50 pH | Allarme minimo pH |
| ALH | SET…14,00 | 7,90 pH | Allarme massimo pH |
| REL | ACID/ALCA | ACID | Tipo di regolazione |
| PRS | NO / NC | NO | Stato del relè pH |
| DEL | 0…255 | 0 Sec. | Tempo di ritardo dos. pH |
| SPM | 20…150 | 20 Colpi /min | Colpi minuto Output Freq. |
| BP | 0,50…2,80 | 0,50 pH | Banda proporzionale |
| REG | ONOF/PULS/PROP | ONOF | Modalità di regolazione |
| OUT | MIS/REG | MIS | Modalità di lav. Output mA |
| HIS | 0,02…1,40 | 0,00 pH | Isteresi |
| RMA | 0-20/4-20 | 4-20 mA | Dinamica Output in mA |
| MMA | 0,1…5,00 | 0,1 mA | Offset Output mA |
| PHS | 0…10,00 | 0 pH | Valore iniziale per reg. mA |
| PHE | PHS…14,00 | 14,00 pH | Valore finale per reg. mA |
| Ton | 0…999 sec | 0 Sec. | Tempo di On (Reg. Puls.) |
| Tof | 0…999 sec | 0 Sec. | Tempo di Of (Reg. Puls.) |
| BND | 0,00…2,00 Ph | 0,00 pH | Banda di Guardia |
| PER | 0…999 sec | 500 Sec | Periodo (Reg. Prop.) |
| MON | 0…255 sec | 0 Sec. | Tempo minimo di On |
| DB | 0…10% BP | 0 % di BP | Banda Morta (His rovesciata) |
| | | | |
| **IMPOSTAZIONI CLORO** | | | |
| SET | 0…5,00 | 0,60 ppm | SET POINT Cloro |
| ALL | 0…SET | 0,30 ppm | Allarme minimo Cloro |
| ALH | SET…5,00 | 1,50 ppm | Allarme massimo Cloro |
| REL | LO | LO | Tipo di regolazione |
| PRS | NO / NC | NO | Stato del relè Cloro |
| DEL | 0…255 | 0 Sec. | Tempo di ritardo dos. Cloro |
| SPM | 20…150 | 20 Colpi/min. | Colpi minuto Output Freq. |
| BP | 0,50…2,80 | 0,50 ppm | Banda proporzionale |
| REG | ONOF/PULS/PROP | ONOF | Modalità di regolazione |
| OUT | MIS/REG | MIS | Modalità di lav. Output mA |
| HIS(*) | 0,02…0,50 | 0,00 ppm | Isteresi |
| RMA | 0-20/4-20 | 4-20 mA | Dinamica Output in mA |
| MMA | 0,1…5,00 | 0,1 mA | Offset Output mA |
| CLS | 0…4,00 | 0 ppm | Valore iniziale per reg. mA |
| CLE | PHS…5,00 | 5,00 ppm | Valore finale per reg. mA |
| Ton | 0…999 sec | 0 Sec | Tempo di On (Reg. Puls.) |
| Tof | 0…999 sec | 0 Sec | Tempo di Of (Reg. Puls.) |
| BND | 0,00…2,00 | 0,00 ppm | Banda di Guardia |
| PER | 0…999 sec | 500 Sec. | Periodo (Reg. Prop.) |
| MON | 0…255 sec | 0 Sec. | Tempo minimo di On |
| DB | 0…10% BP | 0 % di BP | Banda Morta (His rovesciata) |
| CTP | 0…10 | 0 %/°C | Coefficiente di compensazione della misura in funzione della temperatura espresso in %/°C. |
| CPH | ON / OFF | OFF | Abil. Alla correzione della misura cloro in funzione del pH |
| | | | |
| **ABILITAZIONI** | | | |
| EN | S-/-C/SC/-- | SC | Abilita i tasti Cal e Set |
| ID | 1…30 | 1 | Ind. ID rete seriale multipunto |
| BR | 1200…9600 | 2400 | Baud rate seriale RS485 |

# 7___REGOLAZIONI

## 7.1___ON / OFF

Entrare nel menù programmazione (**Vedi Pag 16**) ed individuare la funzione **PRG2**.

| **VARIABILI** | **VALORI DI DEFAULT** | **COMMENTO** | |
|---|---|---|---|
| | | | |
| **IMPOSTAZIONI PH** | | | |
| | | | |
| | | | |
| SET | 7,20 pH | SET POINT pH | |
| ALL | 6,50 pH | Allarme minimo pH | |
| ALH | 7,90 pH | Allarme massimo pH | |
| REL | ACID | Tipo di regolazione | |
| PRS | NO | Stato del relè pH | |
| DEL | 0 Sec | Tempo di ritardo dos. pH | |
| SPM | 20 Sec. | Colpi minuto Output Freq. | |
| BP | 0,50 pH | Banda proporzionale | |
| **REG** | **ONOF** | **Modalità di regolazione** | |
| **OUT** | **MIS / REG** | Modalità di lav. Output mA | |
| HIS | 0,00 pH | Isteresi | |
| MMA | 0,1 mA | OFFSET OUTPUT IN mA | |
| RMA | 4-20 mA | Dinamica Output in mA | |
| PHS | 0 pH | Valore iniziale per reg. mA | |
| PHE | 14,00 pH | Valore finale per reg. mA | |
| | | | |
| **IMPOSTAZIONI CLORO** | | | |
| SET | 0,60 ppm | SET POINT Cloro | |
| ALL | 0,30 ppm | Allarme minimo Cloro | |
| ALH | 1,50 ppm | Allarme massimo Cloro | |
| REL | LO | Tipo di regolazione | |
| PRS | NO | Stato del relè Cloro | |
| DEL | 0 Sec. | Tempo di ritardo dos. Cloro | |
| SPM | 20 Sec. | Colpi minuto Output Freq. | |
| BP | 0,50 pH | Banda proporzionale | |
| **REG** | **ONOF** | **Modalità di regolazione** | |
| **OUT** | **MIS / REG** | Modalità di lav. Output mA | |
| HIS | 0,00 ppm | Isteresi | |
| MMA | 0,1 mA | OFFSET OUTPUT IN mA | |
| RMA | 4-20 mA | Dinamica Output in mA | |
| CLS | 0 ppm | Valore iniziale per reg. mA | |
| CLE | 5,00 ppm | Valore finale per reg. mA | |
| CTP | 0 %/°C | Coefficiente di compensazione della misura in funzione della temperatura espresso in %/°C. | |
| CPH | OFF | Abil. Alla correzione della misura cloro in funzione del pH | |
| **ABILITAZIONI** | | | |
| EN | SC | Abilita i tasti Cal e Set | |
| ID | 1 | Ind. ID rete seriale multipunto | |
| BR | 2400 | Baud rate seriale RS485 | |

Selezionando all'interno del menù la variabile **REG = ONOF** e **OUT = MIS** sarà possibile avere le variabili sopra indicate.
Se **OUT = REG** le variabili da impostare per il pH e per il CLORO saranno soltanto le variabili sottolineate.
E' la regolazione più semplice ed elementare che si possa realizzare. Il dosatore viene acceso al sorpasso della misura del SET POINT e viene spento al ritorno della misura a meno di un certo valore impostato che viene definito ISTERESI.
L'ISTERESI permette di evitare continui attacca - stacca dell'organo dosatore, una isteresi ristretta migliora la regolazione a scapito di una maggiore usura del dosatore (grafici a pagina 19).

## 7.2___PULS

Entrare nel menù programmazione (**Vedi Pag 16**) ed individuare la funzione **PRG2**.

| VARIABILI | VALORI DI DEFAULT | COMMENTO | |
|---|---|---|---|
| | | | |
| **IMPOSTAZIONI PH** | | | |
| | | | |
| SET | 7,20 pH | SET POINT pH | |
| ALL | 6,50 pH | Allarme minimo pH | |
| ALH | 7,90 pH | Allarme massimo pH | |
| REL | ACID | Tipo di regolazione | |
| PRS | NO | Stato del relè pH | |
| DEL | 0 Sec. | Tempo di ritardo dos. pH | |
| SPM | 20 Sec. | Colpi minuto Output Freq. | |
| BP | 0,50 Sec. | Banda proporzionale | |
| **REG** | **PULS** | **Modalità di regolazione** | |
| OUT | MIS | Modalità di lav. Output mA | |
| HIS(*) | 0,00 pH | Isteresi | |
| Ton | 0 Sec. | Tempo di On (Reg. Puls.) | |
| Tof | 0 Sec. | Tempo di Of (Reg. Puls.) | |
| BND | 0,00 pH | Banda di Guardia | |
| RMA | 4-20 mA | Dinamica Output in mA | |
| PHS | 0 pH | Valore iniziale per reg. mA | |
| PHE | 14,00 pH | Valore finale per reg. mA | |
| | | | |
| **IMPOSTAZIONI CLORO** | | | |
| SET | 0,60 ppm | SET POINT Cloro | |
| ALL | 0,30 ppm | Allarme minimo Cloro | |
| ALH | 1,50 ppm | Allarme massimo Cloro | |
| REL | LO | Tipo di regolazione | |
| PRS | NO | Stato del relè Cloro | |
| DEL | 0 Sec. | Tempo di ritardo dos. Cloro | |
| SPM | 20 Sec. | Colpi minuto Output Freq. | |
| BP | 0,50 ppm | Banda proporzionale | |
| **REG** | **PULS** | **Modalità di regolazione** | |
| OUT | MIS | Modalità di lav. Output mA | |
| HIS | 0,00 ppm | Isteresi | |
| Ton | 0 Sec. | Tempo di On (Reg. Puls.) | |
| Tof | 0 Sec. | Tempo di Of (Reg. Puls.) | |
| BND | 0,00 ppm | Banda di Guardia | |
| RMA | 4-20 mA | Dinamica Output in mA | |
| CLS | 0 ppm | Valore iniziale per reg. mA | |
| CLE | 5,00 ppm | Valore finale per reg. mA | |
| CTP | 0 %/°C | Coefficiente di compensazione della misura in funzione della temperatura espresso in %/°C. | |
| CPH | OFF | Abil. Alla correzione della misura cloro in funzione del pH | |
| **ABILITAZIONI** | | | |
| EN | SC | Abilita i tasti Cal e Set | |
| ID | 1 | Ind. ID rete seriale multipunto | |
| BR | 2400 | Baud rate seriale RS485 | |

Selezionando all'interno del menù la variabile **REG = PULS** sarà possibile avere le variabili sopra indicate.

Nella regolazione PULS abbiamo tre variabili fondamentali da impostare e sono:

1) **Ton**
2) **Tof**
3) **BND**

Queste tre variabili ci consentono di regolare il dosaggio in <u>modalità tempo</u> all'interno di due punti:
per il pH tra il **Set point** e il **Set Point più la banda di guardia (BND)**
per il Cloro tra il **Set point** e il **Set Point meno la banda di guardia (BND)**

**Esempio:**
Se noi impostiamo un **set point pH** = 7,20 pH ed una banda di guradia **BND** = 0,20 pH possiamo regolare con un tempo di **Ton e Tof** tra 7,20 pH a 7,40 pH.

Se noi impostiamo un **set point cloro** = 1,00 ppm di cloro ed una banda di guradia **BND** = 0,30 possiamo regolare con un tempo di **Ton e Tof** tra 0,70 ppm a 1,00 ppm.

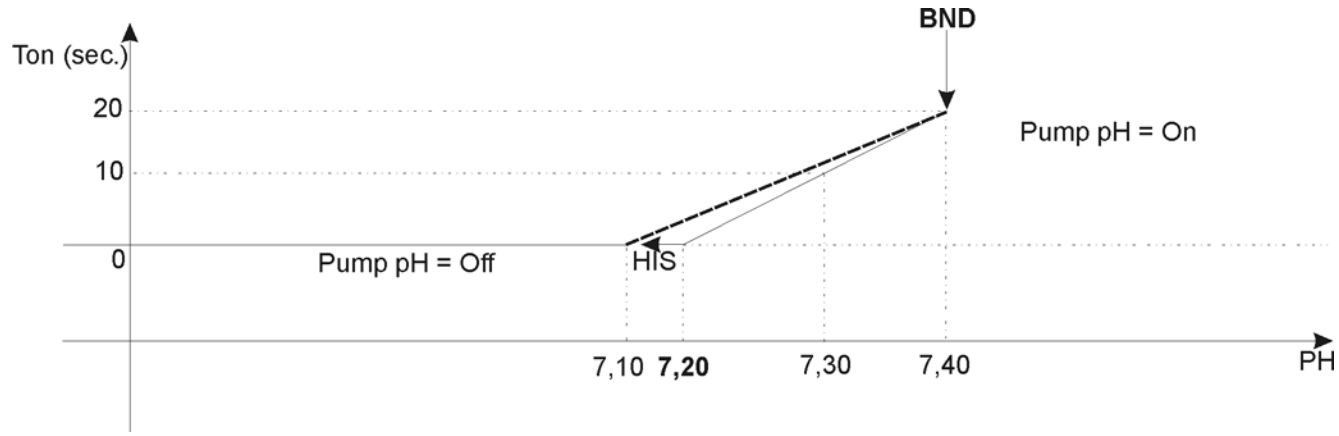
Le regolazioni consentite all'interno di questo intervallo sono due:

**1) Ton e Tof con valori diversi**
Esempio: Ton = 10 sec Tof = 5 sec.
Il tempo di dosaggio della pompa sarà sempre accesa per 10 sec e spenta per 5 sec. All'interno della fascia impostata.

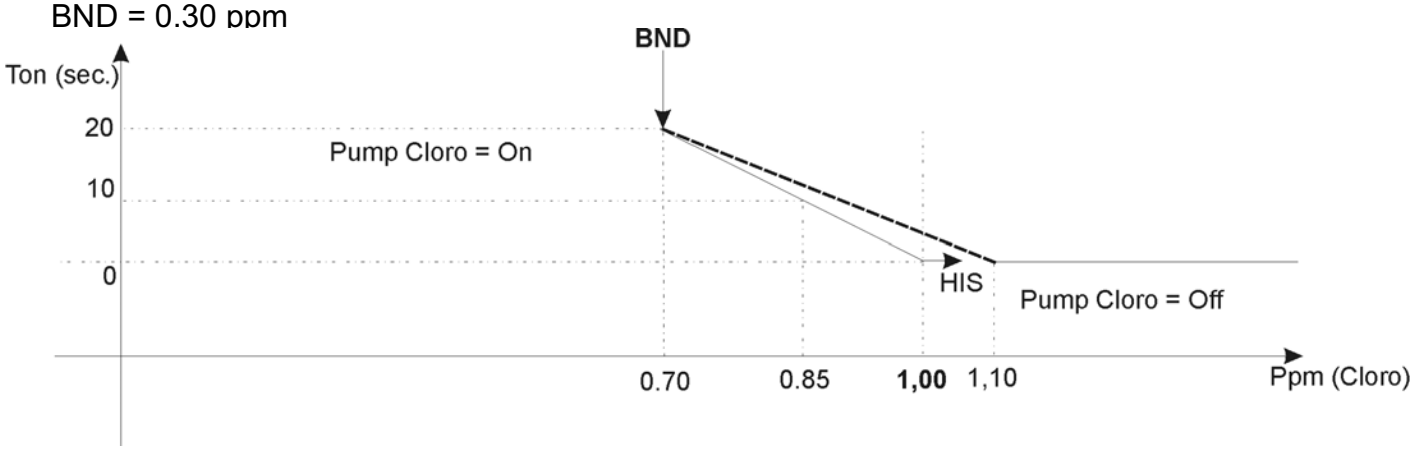
**2) Ton e Tof con valori uguali**
Esempio: Ton = 10 sec Tof = 10 sec.
Il tempo di dosaggio della pompa sarà **proporzionale nel tempo** all'avvicinarsi del Set point all'interno della fascia impostata.

**Esempio proporzionale:**
Nei grafici sotto riportati è descritta la regolazione proporzionale sopra descritta in più è stato rappresentato con una linea tratteggiata la regolazione che si avrebbe se l'operatore impostasse un valore di isteresi (HIS).

Set Point = 7,20 pH
**HIS = 0.10 pH (la regolazione è la linea tratteggiata)**
Ton = 10 Sec.
Tof = 10 Sec.
BND = 0.20 pH




Set Point = 1,00 ppm
**HIS = 0.10 ppm (la regolazione è la linea tratteggiata**
Ton = 10 Sec.
Tof = 10 Sec.
BND = 0.30 ppm



## 7.3___PROP

Entrare nel menù programmazione (**Vedi Pag 16**) ed individuare la funzione **PRG2**.

| VARIABILI | LIMITI CONSENTITI | VALORI DI DEFAULT | COMMENTO |
|---|---|---|---|
| | | | |
| **IMPOSTAZIONI PH** | | | |
| SET | 7,20 pH | SET POINT pH | |
| ALL | 6,50 pH | Allarme minimo pH | |
| ALH | 7,90 pH | Allarme massimo pH | |
| REL | ACID | Tipo di regolazione | |
| PRS | NO | Stato del relè pH | |
| DEL | 0 Sec. | Tempo di ritardo dos. pH | |
| SPM | 20 Colpi/min. | Colpi minuto Output Freq. | |
| BP | 0,50 pH | Banda proporzionale | |
| **REG** | **PROP** | Modalità di regolazione | |
| OUT | MIS | Modalità di lav. Output mA | |
| PER | 500 Sec | Periodo (Reg. Prop.) | |
| MON | 0 Sec | Tempo minimo di On | |
| DB | 0 % di BP | Banda Morta (His rovesciata) | |
| RMA | 4-20 mA | Dinamica Output in mA | |
| PHS | 0 pH | Valore iniziale per reg. mA | |
| PHE | 14,00 pH | Valore finale per reg. mA | |
| | | | |
| **IMPOSTAZIONI CLORO** | | | |
| SET | 0,60 ppm | SET POINT Cloro | |
| ALL | 0,30 ppm | Allarme minimo Cloro | |
| ALH | 1,50 ppm | Allarme massimo Cloro | |
| REL | LO | Tipo di regolazione | |
| PRS | NO | Stato del relè Cloro | |
| DEL | 0 Sec. | Tempo di ritardo dos. Cloro | |
| SPM | 20 Colpi/min | Colpi minuto Output Freq. | |
| BP | 0,50 ppm | Banda proporzionale | |
| **REG** | **PROP** | Modalità di regolazione | |
| OUT | MIS | Modalità di lav. Output mA | |
| PER | 500 Sec. | Periodo (Reg. Prop.) | |
| MON | 0 Sec. | Tempo minimo di On | |
| DB | 0 %di BP | Banda Morta (His rovesciata) | |
| RMA | 4-20 mA | Dinamica Output in mA | |
| CLS | 0 ppm | Valore iniziale per reg. mA | |
| CLE | 14,00 ppm | Valore finale per reg. mA | |
| CTP | 0 %/°C | Coefficiente di compensazione della misura in funzione della temperatura espresso in %/°C. | |
| CPH | OFF | Abil. Alla correzione della misura cloro in funzione del pH | |
| | | | |
| **ABILITAZIONI** | | | |
| EN | SC | Abilita i tasti Cal e Set | |
| ID | 1 | Ind. ID rete seriale multipunto | |
| BR | 2400 | Baud rate seriale RS485 | |

La regolazione proporzionale a tempo permette di inseguire velocemente la variazione della misura ottimizzando il dosaggio in funzione della distanza dal set point.
Questo tipo di regolazione è consigliabile in sistemi ben miscelati e permette un buon grado di regolazione, si presta molto bene sia per il controllo del pH che per quello del cloro.
Una volta scelto il tempo del periodo di modulazione del Ton e del Toff è consigliabile tenere sotto controllo le misure per il primo periodo di lavoro al fine di ottimizarne i tempi.

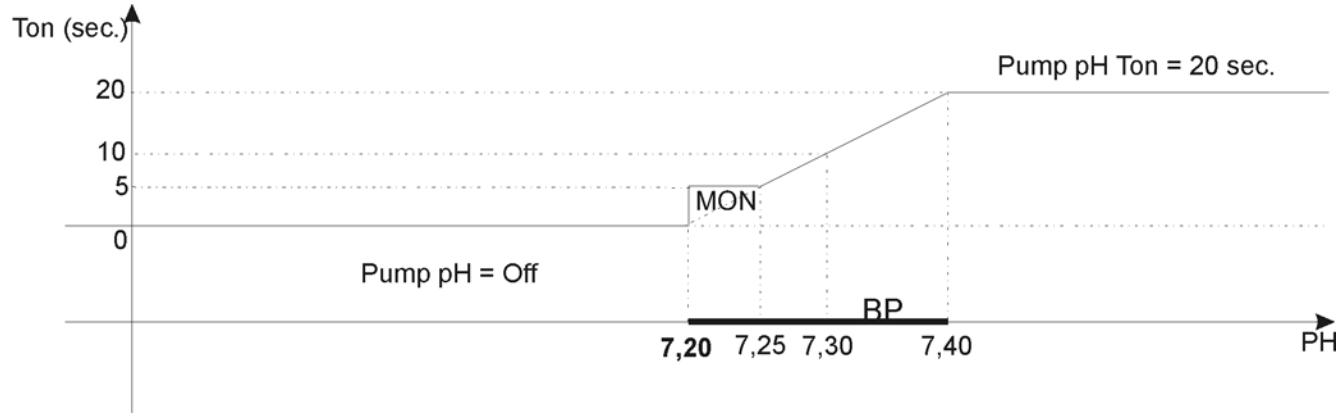
Il valore minimo di Ton **MON** permette di avvicinarsi al SET POINT con un grado di dosaggio sufficiente a farlo superare, altrimenti in vicinanza del set la pompa potrebbe andare sempre al minimo senza mai fermarsi.

**Esempio:**

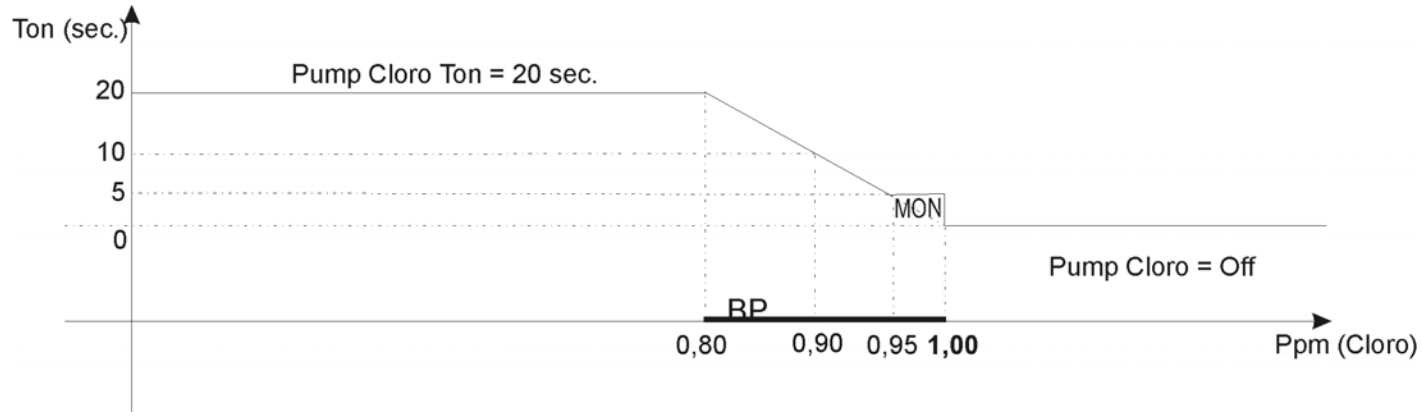
Impostando i seguenti valori si otterrà una regolazione proporzionale nel tempo con un minimo di Ton della pompa dosatrice nell'intorno del Set Point.

| VARIABILI | LIMITI CONSENTITI | VALORI DI DEFAULT | COMMENTO |
|---|---|---|---|
| | | | |
| **IMPOSTAZIONI PH** | | | |
| **SET** | **7,20 pH** | **SET POINT pH** | |
| ALL | 6,50 pH | Allarme minimo pH | |
| ALH | 7,90 Ph | Allarme massimo pH | |
| REL | ACID | Tipo di regolazione | |
| **BP** | **0,20 pH** | **Banda proporzionale** | |
| **REG** | **PROP** | Modalità di regolazione | |
| OUT | MIS | Modalità di lav. Output mA | |
| **PER** | **20 Sec.** | **Periodo (Reg. Prop.)** | |
| **MON** | **3 Sec.** | **Tempo minimo di On** | |

**Nota:** Non è possibile impostare l'isteresi (**HIS**) e il tempo di ritardo (**DEL**) di attivazione della pompa.

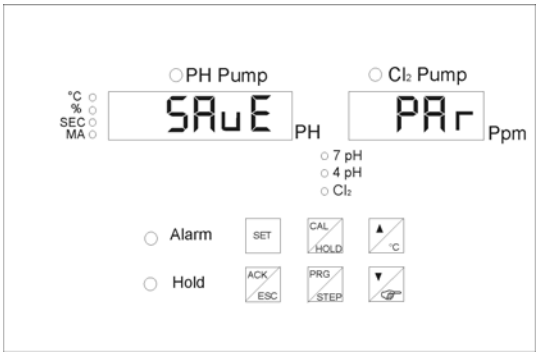



| IMPOSTAZIONI CLORO | | | |
|---|---|---|---|
| **SET** | **1.00 ppm** | **SET POINT Cloro** | |
| ALL | 0,60 ppm | Allarme minimo Cloro | |
| ALH | 1,50 ppm | Allarme massimo Cloro | |
| **BP** | **0,20 ppm** | **Banda proporzionale** | |
| **REG** | **PROP** | Modalità di regolazione | |
| OUT | MIS | Modalità di lav. Output mA | |
| **PER** | **20 Sec.** | **Periodo (Reg. Prop.)** | |
| **MON** | **3 Sec.** | **Tempo minimo di On** | |



## 7.4___SALVATAGGIO PARAMETRI

Per salvare i parametri impostati nel menù di programmazione premere il tasto ACK/ESC **5 secondi** ed attendere il messaggio **SAVE PAR.**




## 7.5___REGOLAZIONE PROPORZIONALE IN CORRENTE

La regolazione proporzionale in corrente è sempre possibile in tutte le regolazioni attraverso le variabile:

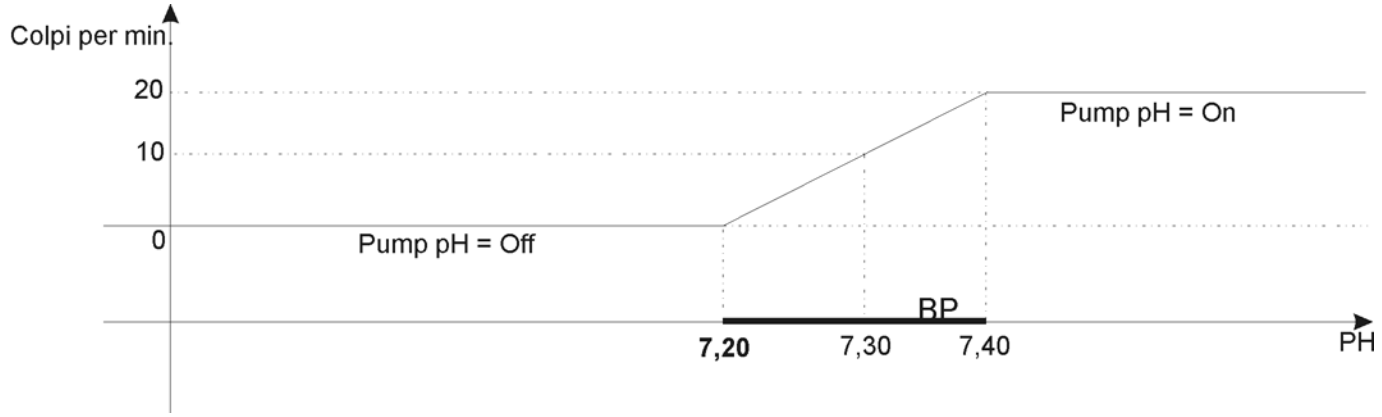
| | | | |
|---|---|---|---|
| PHS | 0 pH | Valore iniziale per reg. mA | |
| PHE | 14,00 pH | Valore finale per reg. mA | |
| CLS | 0 pH | Valore iniziale per reg. mA | |
| CLE | 14,00 pH | Valore finale per reg. mA | |

Attraverso la variabile **RMA = 0-20 mA o 4-20 mA** è possibile impostare la dinamica dell'uscita in corrente.
Per poter regolare la è necessario avere una pompa con ingresso in corrente **0-20 mA o 4-20 mA.**
L'uscita in corrente è utilizzabile anche per un registratore a carta.
Il valore minimo di corrente **MMA** permette di avvicinarsi al SET POINT con un grado di dosaggio sufficiente a farlo superare, altrimenti in vicinanza del set la pompa potrebbe andare sempre al minimo senza mai fermarsi.

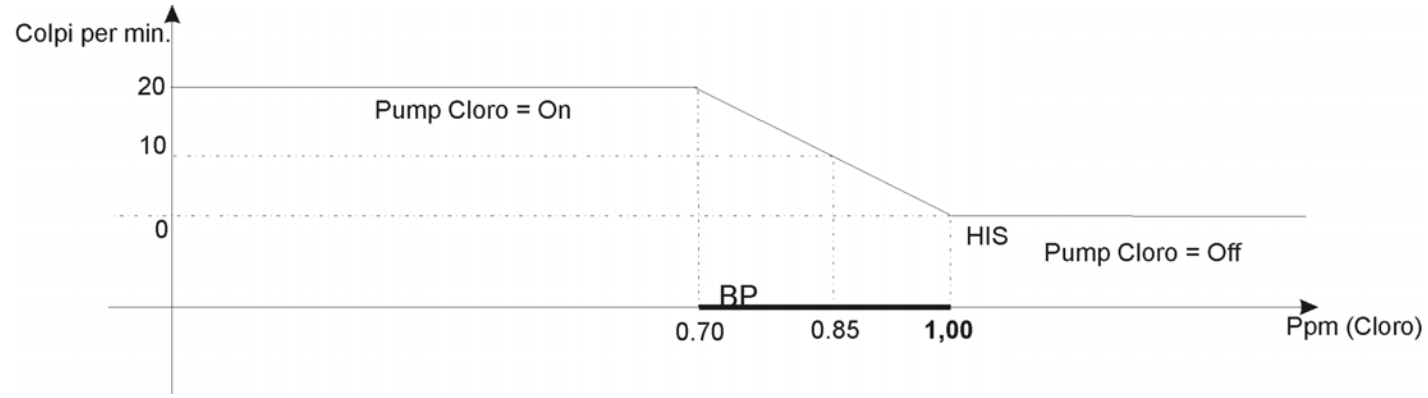
## 7.6___REGOLAZIONE PROPORZIONALE AD IMPULSI

Attraverso le uscite 20, 21 (collegamento pompa pH) 22, 23 (collegamento pompa cloro), descritte a pagina 4 è possibile collegare una pompa dosatrice controllata con impulsi per minuto. Impostando il parametro **SPM** pH e Cloro, presente nel menù di programmazione PRG2, e la banda proporzionale (BP) è possibile regolare con degli impulsi proporzionali alla variazione della misura.

**Esempio:**
Set Point = 7,20 pH
SPM pH = 20 colpi
BP pH = 0.20 pH




Set Point = 1,00 ppm
SPM Cloro = 20 colpi
BP Cloro = 0.20 ppm

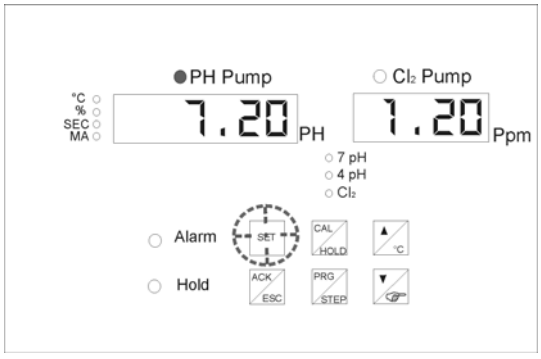


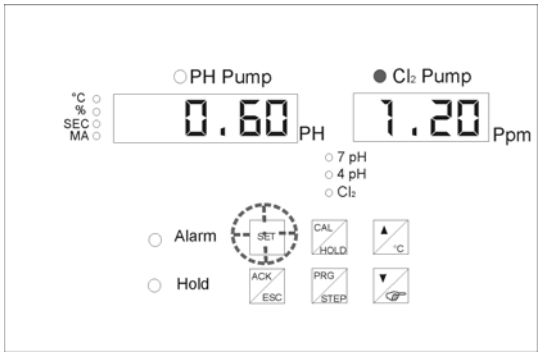

**NB.** Il parametro **SPM** non deve essere maggiore del numero massimo di impulsi per minuto accettati dalla pompa.

## 7.7___FUNZIONE SET POINT

Con il tasto SET permette all'utente di visualizzare ciclicamente i **SET POINT** e di variarli con i tasti °C senza dover entrare in programmazione.

Nel caso in cui venga fatta la protezione in morsettiera e al passo **EN** si è programmato **–C** o **--** con il tasto SET è possibile solo visualizzare i **SET POINT** senza poterli variare.



## 7.8___REGOLAZIONE MANUALE E ADESCAMENTO POMPE.

Con il tasto ▼ mantenuto premuto, permette di attivare in sequenza i rele' di comando delle pompe pH e cloro, premendo contemporaneamente il tasto SET .
Questa funzione torna utile per operazioni di adescamento delle pompe.

## 7.9___ALLARME FLUSSO

Ai morsetti **13 e 14** è collegato un sensore di flusso posto nel tracimatore piezometrico del POOL TOP, se avviene un abbassamento del flusso d'acqua tale da compromettere la misura lo strumento interviene bloccando la clorazione e generando un allarme.
L'allarme flusso si attiva se il consenso resta attivo ininterrottamente per **40 secondi**, in tal caso oltre a vedere il led allarme lampeggiante sul display di misura del pH appare alternativamente alla misura la scritta **FLUS** .
**N.B**. Nello stato di allarme flusso le uscite in corrente vengono forzate a **0 mA**.

## 7.10___PROTEZIONE DELLA PROGRAMMAZIONE

La programmazione dei parametri può essere protetta realizzando un ponte in morsettiera tra i morsetti **12 e 14**.
In questo modo non è più possibile variare i dati di lavoro dello strumento.
Se si preme il tasto PRG/STEP sul display al posto della scritta **PROG** appare la scritta **DIS** ad indicare che tale funzione è disabilitata.
La protezione della programmazione è legata al passo **En** nel quale si possono abilitare le funzioni di impostazione del **SET** e di calibrazione anche quando la programmazione è protetta.

**EN S- / -C / SC / --**

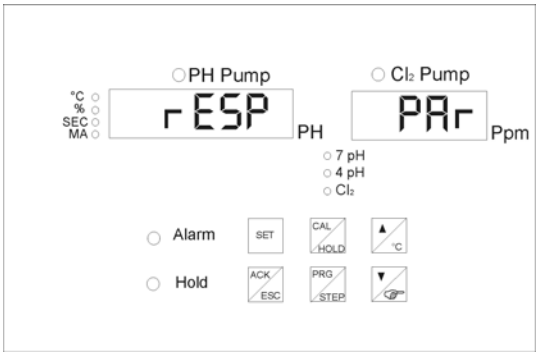
Funzione di abilitazione dei livelli bassi di programmazione quando viene fatta una protezione in morsettiera.

**S-**: Il tasto **SET** resta attivo.
**-C**: Il tasto **CAL** resta attivo.
**SC**: I tasti **SET** e **CAL** restano attivi.
--: Nessun tasto resta attivo.

**NOTA:** I morsetti **12 e 14** possono essere collegati ad un interruttore a chiave esterno che permette l'abilitazione dello strumento solo da personale autorizzato.

## 7.11___RESET PARAMETRI

Per eliminare le vecchie calibrazioni e ripristinare i parametri di default nel menù di programmazione, eseguire i seguenti passi:
spegnere lo strumento
premere il tasto PRG/STEP fino a visualizzare il messaggio **RESP PAR**
premere il tasto CAL/HOLD entro 10 secondi.
Lo strumento visualizza **Save par**.

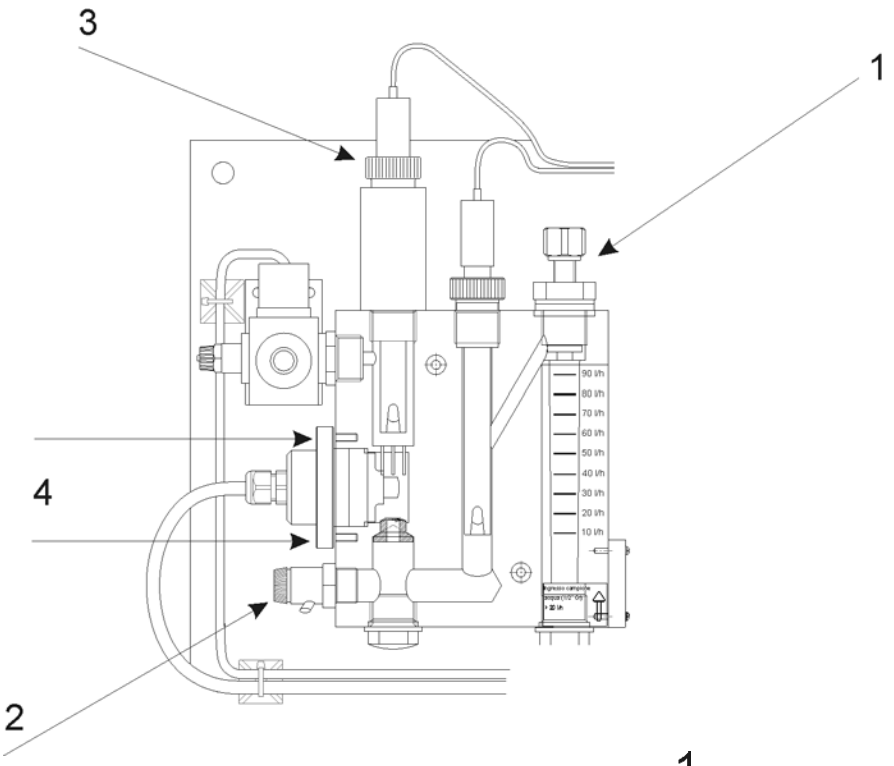


## 7.12___Manutenzione e pulizia sonda Cloro

**<u>Attenzione a non far cadere le palline in vetro contenute all'interno della sonda.</u>**

Eseguire i seguenti passi:

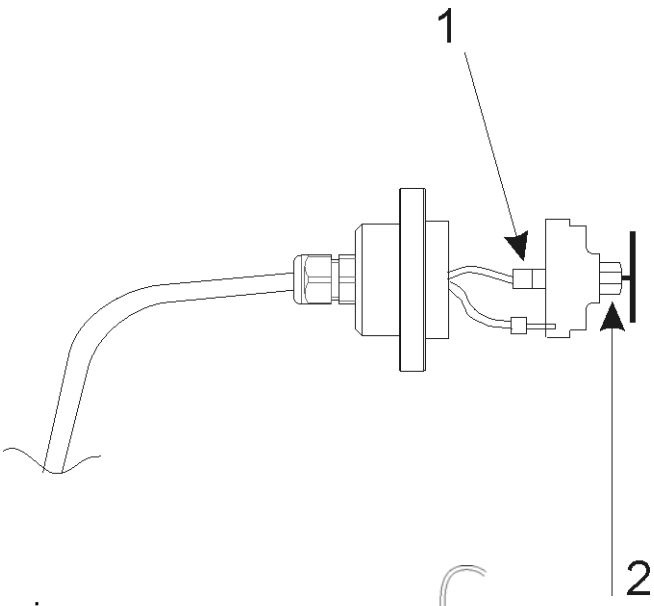
1. Chiudere il flusso d'acqua
2. Aprire il rubinetto di spillaggio perscaricare il circuito.
3. Svitare la sonda pH per favorire lo svuotamento del circuito.
4. Quando il circuito è vuoto svitare ed estrarre la sonda cloro, <u>fare molta attenzione a non far cadere le palline di vetro.</u>




**Pulizia elettrodo Rame:**

1. Sganciare il faston (collegamento elettrodo Platino)
2. Svitare l'elettrodo

Fare attenzione a non deformare la spira di platino conservare in un luogo sicuro.
Strofinare l'elettrodo di rame con lo spazzolino in dotazione in modo da renderlo lucente.

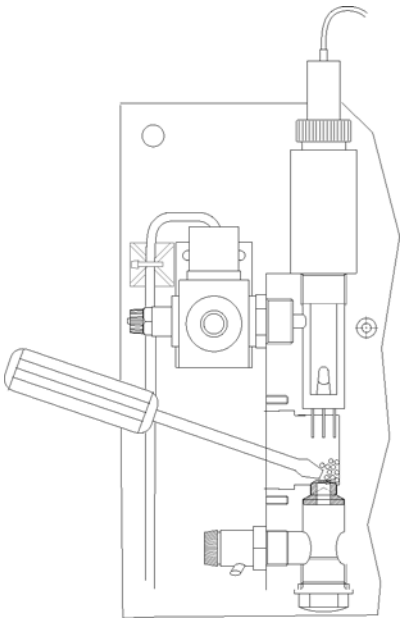



Ultimata l'operazione rimontare le parti facendo attenzione a non deformare l'elettrodo platino.

**Sostituzione palline vetro.**

Per sostituire le palline in vetro eseguire i seguenti passi:

1. Bagnare le palline in dotazione con acqua
2. Utilizzare un giravite con punta piatta per posizionarle all'interno della sonda.
3. A termine lavoro richiudere la sonda in tutte le sue parti.



## 8___MEMO DI PROGRAMMAZIONE

| VARIABILI | VALORI DI DEFAULT | IMPOSTAZIONI | COMMENTO |
|---|---|---|---|
| | | | |
| **IMPOSTAZIONI PH** | | | |
| SET | 7,20 pH | | SET POINT pH |
| ALL | 6,50 pH | | Allarme minimo pH |
| ALH | 7,90 pH | | Allarme massimo pH |
| REL | ACID | | Tipo di regolazione |
| PRS | NO | | Stato del relè pH |
| DEL | 0 Sec. | | Tempo di ritardo dos. pH |
| SPM | 20 Colpi/min. | | Colpi minuto Output Freq. |
| BP | 0,50 pH | | Banda proporzionale (pH) |
| REG | ONOF | | Modalità di regolazione |
| OUT | MIS | | Modalità di lav. Output mA |
| HIS | 0,00 pH | | Isteresi (pH) |
| RMA | 4-20 mA | | Dinamica Output in mA |
| MMA | 0,1 mA | | Offset Output mA |
| PHS | 0 pH | | Valore iniziale per reg. mA |
| PHE | 14,00 pH | | Valore finale per reg. mA |
| Ton | 0 Sec | | Tempo di On (Reg. Puls.) |
| Tof | 0 Sec. | | Tempo di Of (Reg. Puls.) |
| BND | 0,00 pH | | Banda di Guardia |
| PER | 500 Sec. | | Periodo (Reg. Prop.) |
| MON | 0 Sec. | | Tempo minimo di On |
| DB | 0 % di BP | | Banda Morta (His rovesciata) |
| | | | |
| **IMPOSTAZIONI CLORO** | | | |
| SET | 0,60 ppm | | SET POINT Cloro |
| ALL | 0,30 ppm | | Allarme minimo Cloro |
| ALH | 1,50 ppm | | Allarme massimo Cloro |
| REL | LO | | Tipo di regolazione |
| PRS | NO | | Stato del relè Cloro |
| DEL | 0 Sec | | Tempo di ritardo dos. Cloro |
| SPM | 20 Colpi/min. | | Colpi minuto Output Freq. |
| BP | 0,50 pH | | Banda proporzionale |
| REG | ONOF | | Modalità di regolazione |
| OUT | MIS | | Modalità di lav. Output mA |
| HIS | 0,00 ppm | | Isteresi |
| RMA | 4-20 mA | | Dinamica Output in mA |
| MMA | 0,1 mA | | Offset Output mA |
| CLS | 0 ppm | | Valore iniziale per reg. mA |
| CLE | 5,00 ppm | | Valore finale per reg. mA |
| Ton | 0 Sec. | | Tempo di On (Reg. Puls.) |
| Tof | 0 Sec | | Tempo di Of (Reg. Puls.) |
| BND | 0,00 ppm | | Banda di Guardia |
| PER | 500 Sec | | Periodo (Reg. Prop.) |
| MON | 0 Sec | | Tempo minimo di On |
| DB | 0 % di BP | | Banda Morta (His rovesciata) |
| CTP | 0 %/°C | | Coefficiente di compensazione della misura in funzione della temperatura espresso in %/°C. |
| CPH | OFF | | Abil. Alla correzione della misura cloro in funzione del pH |
| | | | |
| **ABILITAZIONI** | | | |
| EN | SC | | Abilita i tasti Cal e Set |
| ID | 1 | | Ind. ID rete seriale multipunto |
| BR | 2400 | | Baud rate seriale RS485 |